Prep 3 final revision

FIRST:ALGEBRA

Choose the correct answer:

1)	If: $n_1(x) = \frac{x+2}{x-1}$, $n_2(x) = \frac{x-5}{x+3}$, then the common domain of the two function n_1 and n_2 is .... ($\mathbb{R}-\{1,-2\}$ or $\mathbb{R}-\{-3,5\}$ or $\mathbb{R}$ or $\mathbb{R}-\{1,-3\}$)
2)	The set of zeroes of the function f where $f(x) = 2x^2$ is .... ($\{0\}$ or $\mathbb{R}-\{0\}$ or $\mathbb{R}-\{2\}$ or $\mathbb{R}$)
3)	If (2, 1) is a solution of the equation: $2x + ay = 6$, then a = ... (2 or 6 or 1 or 3)
4)	If A and B are two mutually exclusive events, then P (A ∩ B) = ... (1 or 0 or ∅ or $\frac{1}{2}$)
5)	The point of intersection of the two straight lines which equations are $X + y = 3$ *and* $X - y = 1$ is............ ((1 , 2) or (4 , —1) or (2 , 1) or (5 , −2))
6)	If A and B are two events from the sample space of a random experiment P(B) = 0.7 and P(A) = 0.2 and $A \subset B$, then $P(A \cup B)$ =............ (zero or 0.2 or 0.7 or 0.5)
7)	If the sum of two positive numbers is 9 and their product is 8, then the two numbers are .... (2 , 7 or 3 , 6 or 4 , 5 or 1 , 8)
8)	The S.S. of the two equations: $x + y = 0, x - 2 = 0$ *in* $\mathbb{R} \times \mathbb{R}$ *is* $\{(0,2)\}$ or $\{(2,2)\}$ or $\{(-2,2)\}$ or $\{(2,-2)\}$

9)	If a regular dice is rolled once then the probability of getting an even number equal .... $(3$ or 1 or $\frac{1}{2}$ or $\frac{1}{3})$
10)	The simplest form of the function f where: $f(x) = \frac{2x^2 + x}{x}$ and $x \neq 0$ .... $(3x$ or $2x^2 + 1$ or $x^2 + 1$ or $2x + 1)$
11)	If: p (A) = $\frac{1}{3}$, than p ($\grave{A}$) = ... $(\frac{1}{3}$ or $\frac{2}{3}$ or 1 or $\frac{1}{2})$
12)	If the domain of the function: $n(x) = \frac{1}{x} + \frac{9}{x+b}$ is $\mathbb{R} - \{0, 4\}$, than b = ... $(0$ or 4 or -4 or $3)$
13)	If A and B are mutually exclusive events and if P (A) = $\frac{1}{3}$, $P(A \cup B) = \frac{7}{12}$, then P (B) = ... $(\frac{1}{3}$ or $\frac{1}{4}$ or $\frac{1}{2}$ or $\frac{2}{3})$
14)	The set of zeroes of f where: $f(x) = -3x$ is .... $(\{0\}$ or $\{-3\}$ or $\{-3, 0\}$ or $\mathbb{R})$
15)	If A and B are two events from S where $B \subset A$, then $P(A \cap B)$ = ... (zero or P (B) or P (A) or P (A−B)
16)	The solution set of the two equations: $x + 3y = 4$, $3y + x = 1$ is .... $\{(3, 1)\}$ or $\{(1, 3)\}$ or $\emptyset$ or $\{(1, 0)\}$
17)	If: P (A) = P ($\grave{A}$), than P (A) = ... (zero or 1 or $\frac{1}{2}$ or $\frac{1}{3}$)

18)	The domain of the function n : n $(x) = \frac{x}{x^2+9}$ is .... ($\mathbb{R}$ or $\mathbb{R}-\{3\}$ or $\mathbb{R}-\{-3\}$ or $\mathbb{R}-\{3,-3\}$)
19)	If: n $(x) = \frac{3}{x+l}$ and the domain of the function is $\mathbb{R}-\{-2\}$, than l = ... (-2 or 3 or 2 or -3)
20)	If A is an event of the sample space of a random experiment and P (A) = P (À), then P (A) = ... (1 or zero or $\frac{1}{2}$ or $\emptyset$)
21)	The number of the solutions of the two equations: $X-2y = 2$ *and* $3X - 6y = 6$ is .... (1 or 2 or 3 or an infinite)
22)	If: x = 3 is a root of the equation: $x^2 + mx = 3$, then m = ... (-1 or -2 or 2 or 1)
23)	If A and b are two events, A ⊂ B , P (A ∩ B) = ... (zero or P (A) or P (B) or P (A ∪ B))
24)	If : n $(x) = \frac{x-3}{x+3}$, then the domain of n $^{-1}(x)$ = ... ($\mathbb{R}$ or $\mathbb{R}-\{-3\}$ or $\mathbb{R}-\{3\}$ or $\mathbb{R}-\{3,-3\}$)
25)	The set of zeroes of the function $f : f(x) = \frac{x^2-4}{x^2-5x+6}$ is .... ($\{-2\}$ or $\{2,3\}$ or $\{2,-2\}$ or $\{2,-2,3\}$)
26)	The ordered pair which satisfy the two equations: $xy = 2 , x-y = 1$ is .... ((1 , 2) or (2 , 1) or (1 , 1) or (3 , 1))

27)	The simplest form of the function $f: f(x)=\frac{5-x}{x-5}, x \neq 5$ is .... $(5$ or 0 or -1 or $1)$
28)	If A and B are two events, P (A) = P (À), then P (A) = ... $(0$ or $\frac{1}{2}$ or 1 or $\frac{1}{4})$
29)	The common domain of functions: $f_1(x)=\frac{1}{x-1}, f_2(x)=\frac{1}{x^2+4}$ is........ $(\mathbb{R}$ or $\mathbb{R}-\{1\}$ or $\mathbb{R}-\{1,2\}$ or $\mathbb{R}-\{1,2,-2\})$
30)	If: P (A) = $\frac{2}{3}$, P (B) = $\frac{1}{2}$, P (A ∩ B) = $\frac{1}{3}$, then P (A ∪ B) = ... $(\frac{5}{6}$ or $\frac{1}{3}$ or $\frac{1}{2}$ or $\frac{1}{4})$
31)	If: P (A) = P (À), then P (A) = ... (zero or $\frac{1}{2}$ or $\frac{1}{3}$ or 1)
32)	If the two equations: $x+4y=7$, $3x+ky=21$ have infinite solutions k = ... (4 or 12 or 7 or 21)
33)	The set of zeros of f where $f(x)=x^2-6x+9$ is .... $(\mathbb{R}$ or $\{2,3\}$ or $\{zero\}$ or $\{3\})$
34)	The point of intersection of the two straight lines: $3x+5y=0$, $5x-3y=0$ is .... ((0 , 0) or (−3 , 5) or (3 , 5) or (−5 , 3))
35)	If : A , B are two events in sample space of random experiment and P (A) = $\frac{1}{2}$, P (B) = $\frac{1}{3}$, P (A ∪ B) = $\frac{5}{6}$, then .... B ⊂ A or B complement A A , B mutually exclusive or A ⊂ B.

36)	The two numbers whose sum 7 and their product 12 are .... (2 , 5 or 3 , 4 or 2 , 6 or 1 , 6)
37)	If A and B are two events of the sample space of a random experiment and if P (A) = 0.7, P (A − B) = 0.5, then P (A ∩ B) = ... (0.2 or 0.5 or 0.7 or 0.3)
38)	If A and B are two mutually exclusive events from a sample space, then P (A ∩ B) = ... ($\frac{1}{2}$ or 1 or zero or 3)
39)	If the algebraic fraction n : $n(x) = \frac{x}{x-2}$ has a multiplicative inverse, then the domain of $n(x)$ is .... ($\mathbb{R}$ or $\mathbb{R} - \{0\}$ or $\mathbb{R} - \{2\}$ or $\mathbb{R} - \{0 , 2\}$)
40)	The S.S. of the two equations: $x - y = 0$ and $x\,y = 4$ in $\mathbb{R} \times \mathbb{R}$ is .... $\{(0 , 0)\}$ or $\{(2 , 2)\}$ $\{(-2 , -2)\}$ or $\{(2 , 2), (-2 , -2\}$
41)	The set of zeros of the function f where: $f(x) = \frac{(x-5)(x-4)}{x^2+16}$ is...... ($\{5 , 4\}$ or $\{5\}$ or $\{4 , -4\}$ or $\mathbb{R} - \{4 , -4\}$)
42)	If : $x \neq 5$, then $\frac{x-5}{5-x} =$ .... (1 or −1 or zero or 5)
43)	The common domain of the two fractions: $n_1(x) = \frac{x}{3}$ and $n_2(x) = \frac{3}{x}$ is .... ($\mathbb{R} - \{0 , 3\}$ or $\mathbb{R} - \{3\}$ or $\mathbb{R} - \{0\}$ or $\mathbb{R}$)
44)	The S.S. in $\mathbb{R} \times \mathbb{R}$ of the two equations: $x + 3y = 4$ and $x + 3y = 1$ is .... $\{(1 , 3)\}$ or $\{(0 , 0)\}$ or $\emptyset$ or $\{(4 , 1)\}$

45)	$n(x) = \frac{x-1}{x}$ has multiplicative inverse in the domain .... $(\mathbb{R} - \{0\}$ or $\mathbb{R} - \{1\}$ or $\mathbb{R} - \{0, 1\}$ or $\{0, 1\})$
46)	One of the solutions for the equation: $2x - y = 1$ is .... (2 , 1) or (1 , 2) or (2 , 3) or (0 , 0)
47)	If the regular coin is tossed once, then the probability of getting head and tail together equal .... (0% or 25% or 50% or 100%)
48)	If A ⊂ B, then P (A ∩ B) = ... (0 or P (A) or P (B) or P (∩ B)
49)	The simplest form of the function n: $n(x) = \frac{x^3 - x}{x}$, $x \neq 0$ is n (x) = ... $(x^2$ or $x^2 - 1$ or $x^2 - x$ or $x^3 - 1)$
50)	The domain of the function $f : f(x) = \frac{x-2}{x^2-4}$ is .... $\{-2, 2\}$ or $\mathbb{R} - \{2\}$ or $\mathbb{R} - \{-2\}$ or $\mathbb{R} - \{-2, 2\}$
51)	If $Z(f) = \{2\}$ and $f(x) = x^3$ + m, then m = ... $(-8$ or 8 or 2 or $-2)$
52)	One of the solutions for the two equation: $x - y = 3$, $x y = 4$ is .... (1 , 4) or (2 , −1) or (4 , 1) or (1 , −2)
53)	The S.S. in $\mathbb{R} \times \mathbb{R}$ of the two equations: y −3 = 0 and $x + y = 0$ is .... $\{3, 3\}$ or $\{(-3, 3)\}$ or $\{(3, 0)\}$ or $\{(0, 3)\}$

54)	If A and B are two events in the sample space of a random experiment and P (A) = 0.7 , P (A⋂B) = 0.2, then P(A−B) = ………… (0.5 or 0.9 or 0.7 or 0.2)
55)	If : $n(x) = \frac{x-5}{x-2}$, then the domain of n^{-1} = ………… $\{2, 5\}$ or $\mathbb{R} - \{2\}$ or $\mathbb{R} - \{5\}$ or $\mathbb{R} - \{2, 5\}$
56)	The solution set of the two equations : $x - y = 0$, $x\,y = 9$ is …….. $\{(-3, 3)\}$ or $\{(3, 3), (-3, -3)\}$ $\{(0, 0)\}$ or $\{(3, -3)\}$
57)	The set of zeros of the function f in $\mathbb{R}$ where : $f(x) = \frac{x+7}{4}$ is ……… $\{-7\}$ or $\{-4\}$ or $\mathbb{R}$ or $\emptyset$)
58)	If the probability that one student succeeds in mathematics exam = 0.6 then the probability that he fails in it equal = ………… (1 or 0 or 0.4 or 0.6)
59)	The S.S. in of the two equations: $x + y = 0$, $y = 4$ in $\mathbb{R} \times \mathbb{R}$ is…….. $\{(4, 4)\}$ or $\{(0, 4)\}$ or $\{(-4, 4)\}$ or $\{(4, -4)\}$
60)	The two straight lines: $x + 3 = 0$, $y = 4$ are intersected in ……… quadrant. (third or fourth or first or second)

1)	(a) Find : $n(x)$ in its simplest form showing the domain of n where: $n(x) = \frac{3x-4}{x^2-5x+6} + \frac{2x+6}{x^2+x-6}$ (b) Find algebraically the S.S. in $\mathbb{R} \times \mathbb{R}$ of the two equations: $x - 3y = 6$ and $2x + y = 5$

2)	**(a)** Find the solution set in $\mathbb{R}$ of the equation : $x^2 - 5x + 3 = 0$ approximating the roots to the nearest tenth. **(b)** The perimeter of a rectangle is 14 cm. and its area 12 cm.^{2} Find each of its two dimensions.
3)	**(a)** If: $n(x) = \frac{x^2 + x + 1}{x^2 - 9} \div \frac{x^3 - 1}{x^2 - 4x + 3}$, then find $n(x)$ in its simplest form showing the domain of n. **(b)** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations: $x + y = 3$ and $xy + y^2 = 6$
4)	**(a)** If A and B are two events from the sample space of a random experiment , P (A) = 0.7 , P (B) = 0.4 and P (A ∩ B) = 0.2 , then find (1) P (À) (2) P (A ∪ B) **(b)** Graph the quadratic function f where $f(x) = x^2 - 4x + 3$, $x \in [-1, 5]$, then from the graph deduce : 1) The coordinates of the vertex of the curve. 2) The minimum value of the function. 3) The S.S. in $\mathbb{R}$ of the equation : $x^2 - 4x + 3 = 0$
5)	**(a)** Find algebraically the S.S. of the two equations: $2x - y + 3 = 0$ and $x + 2y + 4 = 0$ in $\mathbb{R} \times \mathbb{R}$ **(b)** The difference between two numbers is 5 and the product of them is 36 find the two numbers.

6)	(a) If A and B are two events in the sample space of a random experiment and P (A) = 0.6 , P (B) = 0.3 , P (A ∩ B) = 0.2 , then find: 1) P (A ∪ B) 2) P (A – B) (b) Simplify to its simplest form showing the domain of n where : $n(x) = \frac{3x}{x^2 - 2x} - \frac{12}{x^2 - 4}$
7)	(a) Find the S.S. of the two equations : $3x + 4y = 24$ and $x - 2y = -2$ in $\mathbb{R} \times \mathbb{R}$ (b) Find by using the general formula the solution set of the equation : $3x^2 - 6x + 1 = 0$
8)	(a) Find : n (x) in the simplest form showing the domain where : $n(x) = \frac{x^2 - 3x + 2}{x^2 - 49} \div \frac{x - 2}{x + 7}$ (b) Graph the function f : $f(x) = x^2 - 1$ taking $x \in [-2, 2]$and from the graph deduce : 1) The coordinates of the vertex of the curve. 2)The minimum or maximum value of the function. 3)The two roots of the equation $f(x) = 0$
9)	(a) Find the S.S. of the equation : $x^2 - 2x - 4 = 0$ in $\mathbb{R}$ approximating the result to the nearest tenth. (b) Find n(x) in the simplest from showing the domain of n where: $n(x) = \frac{x^2 + x + 1}{x} \times \frac{x^2 - x}{x^3 - 1}$

10)	(a)Find graphically, then verify algebraically the S.S. in $\mathbb{R} \times \mathbb{R}$ to the equations: $y = x + 4$ *and* $x + y = 4$ (b) Put in the simplest form with determining the domain of the function n: $n(x) = \frac{x^2 - 4}{x^2 + 3x + 2} - \frac{x^2 - 2x}{x^2 - x - 2}$ then, find n (1)
11)	(a) 12 cards numbered from 1 to 12, if a card is picked randomly, what's the probability of getting an odd number divisible by 3 (b) Find algebraically the solution set of the two equations: $y - x = 2 , x^2 + x y - 4 = 0$
12)	(a) Represent graphically the function $f : f(x) = 4 - x^2$ on the interval $[-3, 3]$ and from the drawing deduce the : 1) Roots of the equation : $f(x) = 0$ 2) Equation of symmetric axis. (b) A rectangle with a length more than its width by 4 cm. If the perimeter of the rectangle is 28 cm. , find area of the rectangle.
13)	(a) Find in $\mathbb{R} \times \mathbb{R}$ the S.S. of the two equations : $y - x = 3$ and $x^2 - 2x + 3y = 15$ (b) If : $n(x) = \frac{x^2 - 2x + 1}{x^3 - 1} \div \frac{x - 1}{x^2 + x + 1}$, then find $n(x)$ in the simplest form showing the domain of n
14)	(a) Find the solution set of the equation by using the general rule rounding the result to the nearest two decimal digits : $3x^2 - 5x + 1 = 0$ (b) A rectangle whose length is greater than its width by 3 cm., if twice its length is smaller than four times its width by 2 cm., find length and width of the rectangle.

15)	(a) Find the solution set of the two equations: $2x - y = 3, x + 3y = 5$ algebraically (b) Find $n(x)$ in the simplest form showing its domain where : $n(x) = \frac{2x+6}{x^2+x-6} + \frac{3x-4}{x^2-5x+6}$
16)	(a) Represent graphically the function : $f(x) = x^2 + 3$, where $x \in [-3, 3]$ and from the drawing deduce : 1) The S.S. of the equation $f(x) = 0$ 2) The equation of the symmetry axis. (b) If A and B are two events of a sample space of a random experiment and P (A) = $\frac{4}{9}$, P (B) = $\frac{1}{3}$, P (A ∪ B) = $\frac{2}{3}$ Find : P (A ∩ B)
17)	(a) Find n (x) in the simplest form showing the domain of n where: $n(x) = \frac{x^2-4}{x^2+3x+2} \div \frac{x^2-2x}{x^2-x-2}$, then find n (- 1) if possible. (b) Two acute angles in a right-angled triangle, the difference between their measure 40^{o} , find the measure of each angle.
18)	(a) Find the S.S. of the two equations : $x + y = 7$ *and* $x^2 + y^2 = 25$ in $\mathbb{R} \times \mathbb{R}$ (b) Find the solution set of the equation (using formula) to: $x(x+2) = 1$, rounding the results to two decimal places.
19)	(a) Find the solution set for each pair of the following two equations algebraically or graphically : $x - 2y = 0$ *and* $2x - y = 3$ (b) Find n (x) in the simplest form showing the domain of n where: $n(x) = \frac{3}{12x^2-3} - \frac{2x}{4x^2-2x}$ then find n (0) if possible.

20)	(a) A bag contains 20 identical card numbered from 1 to 20 a card is randomly drawn. Find the probability that number on the card is : (1) divisible by 3 (2) an odd and divisible by 5 (b) Draw the graphical form of the function f where : $f(x) = x^2 - 2x - 3$ in the interval $[-2, 4]$and from the drawing find: 1) The vertex of the curve. 2)The maximum value or the minimum value of the function. 3)The two roots of the equation $f(x) = 0$
21)	(a) Find graphically or algebraically the S.S. of the two equations : $x + y = 4, 2x - y = 2$ in $\mathbb{R} \times \mathbb{R}$ (b) The sum of two integers is 9 and the differance between their squares is 27 find the two numbers.
22)	(a) Find the function n in its simplest form showing its domain where : $n(x) = \frac{x-1}{x^2-1} \div \frac{x^2-5x}{x^2-4x-5}$ (b) Find the S.S. of two equations : $x - y = 1,\ x^2 + y^2 = 13$
23)	(a) Using formula find SS. of : $x^2 - 4x + 1 = 0$, approximated to two decimals. (b) If : $n(x) = \frac{x^2-2x+4}{x^3+8} + \frac{x^2-x-2}{x^2-4}$ Put $n(x)$ in the simplest form showing its domain.
24)	(a) A box contains 20 symmetrical balls , 8 red 7 white and the rest is green one ball was drawn randomlly find probability that it was. 1) Red 2) White or green 3) Not white (b) Draw the graph of function f where $f(x)x^2 - 4x + 3$, $x \in [0, 4]$ From the graph find : 1) The maximum or minimum value 2) The S.S. of $x^2 - 4x + 3 = 0$

25)	(a) If : n $(x) = \frac{x^2-1}{x^2+3x+2} \div \frac{x^2-x}{x^2+2x}$, then find n (x) in the simplest from showing the domain of n (b) Find in $\mathbb{R} \times \mathbb{R}$ graphically and algebraically the S.S. of the two equations : $y = x + 1$ *and* $y = 2x - 1$
26)	(a) A rectangle is with a length more that its width by 2 cm. If the perimeter of the rectangle is 32cm. Find the area of the rectangle. (b) If A and B are two events of the sample space of a random experiment , P (A) = 0.5 and P(A ∪ B) = 0.8 and P (B) = x ,then find the value of x if : 1) P (A ∩ B) = 0.1 2) A ⊂ B
27)	(a) Graph the function f where : $f(X) = x^2 - 4x + 3$, on the interval [- 1 , 5] and from the graph find : 1)The minimum value of the function. 2)The equation of the axis of symmetry. 3)The S.S. of the equation $f(X) = 0$ (b) Find The S.S. of the equation : $3x^2 = 5x - 1$ approximating the result to the nearest two decimal digits.
28)	(a) Find in $\mathbb{R} \times \mathbb{R}$ the S.S. of the two equations : $y - x = 2$ and $x^2 + xy - 4 = 0$ (b) Find n (x) in the simplest form showing the domain of n : n $(x) = \frac{3x-15}{x^2-8x+15} - \frac{x^2-3x-18}{9-x^2}$

29)	(a) Find n (x) in the simplest form showing the domain of n where: $n(x) = \frac{x}{x^2+2x} - \frac{x-2}{4-x^2}$, then find : n (-2) if possible. (b) A rectangle whose diagonal length 5 cm. and perimeter 14 cm. find its two dimensions.
30)	(a) Find n (x) in the simplest from identifying the domain , where : $n(x) = \frac{x^2-49}{x^3-8} \div \frac{x+7}{x-2}$ (b) Find the solution set for the two equations: $x - y = 0, x\,y = 9$
31)	(a) Find graphically or algebraically the S.S. in $\mathbb{R} \times \mathbb{R}$ of the two equation : $2x + y = 1 , x + 2y = 5$ (b) Find the solution set of : $x^2 - x = 4$, using the general rule. Given that $\sqrt{17} = 4.12$
32)	(a) Draw the graphical representation of the function f where : $f(x) = x^2 - 2x$ in the interval [- 1 , 3] and from the drawing find the roots of the equation $f(x) = 0$ (b) If A and B are two events in sample space of a random experiment where P (A) = $\frac{3}{8}$, P(B) = $\frac{1}{2}$, P (A ∪ B) = $\frac{5}{8}$ Find : P (À) and P (A ∩ B)
33)	(a) Find n (x) in the simplest form determining the domain of n where : $n(x) = \frac{x^2-2x+4}{x^3+8} + \frac{x^2-x-2}{x^2-4}$ (b) A rectangle whose length exceeds width by 4 cm. , if the perimeter of the triangle is 28 cm. Find its area.

34)	(a) Find in $\mathbb{R} \times \mathbb{R}$ the S.S. of the two equations : $x - 2y = 4$ and $3x + y = 5$ (b) Find the solution set for the two equations : $x = y + 2 , x^2 + xy = 0$
35)	(a) Find the solution set of the equations : $x^2 + x = 3$ rounding the result to one decimal digit. (b) Find n (x) in the simplest form identifying its domain where : $n(x) = \frac{x^3 - 8}{x^2 + x - 6} \div \frac{x^2 + 2x + 4}{x - 3}$
36)	(a) Represent graphically the function f where : $f(x) = (x - 2)^2, x \in \mathbb{R}$ where $x \in [-1, 5]$ and from the drawing find the roots of the equation $f(x) = 0$ (b) If A and B are two events from a sample space of a random experiment and P (A) = 0.5 , P (A ∪ B) = 0.9 and P (B) = x , then find the value of x if A and B are mutually exclusive events.
37)	(a) Find n (x) in the simplest form showing the domain of n : $n(x) = \frac{x^2 + 2x - 3}{x + 3} \div \frac{x^2 - 1}{x + 1}$ (b) Find the S.S. of the two equations : $y - x = 2 , x^2 + xy - 4 = 0$ in $\mathbb{R} \times \mathbb{R}$
38)	(a) A number formed from two digits their sum is 11 and twice the units digit exceeds three times the tens digit by 2 find the number. (b) Find the solution set of the equation : $x^2 - 4x + 1 = 0$ in $\mathbb{R}$ rounding the result to two decimal place.

39)	(a) Find n (x) in the simplest form identifying the domain , where : $n(x) = \frac{x}{x^2+2x} + \frac{x-2}{x^2-4}$ (b) Find the solution set of the two equations : $x + y = 7 , 5x - y = 5$
40)	(a) A bag contains 20 identical cards numbered from 1 to 20 , a card is randomly drawn , find the probability that the number is : 1) divisibly by 5 2) divisibly by both numbers 5 or 7 (b) Represent the quadratic function $f(x) = x^2 - 4$, graphically in the interval $[-2 , 2]$ and from the graph find : 1)The minimum or maximum value of the function. 2)The set of zeros of the function f

The answer

1)	$\mathbb{R}-\{1,-3\}$	2)	$\{0\}$	3)	2
4)	0	5)	$(2,1)$	6)	0.7
7)	1 , 8	8)	$\{(2,-2)\}$	9)	$\frac{1}{2}$
10)	$2x+1$	11)	$\frac{2}{3}$	12)	-4
13)	$\frac{1}{4}$	14)	$\{0\}$	15)	P (B)
16)	$\emptyset$	17)	$\frac{1}{2}$	18)	$\mathbb{R}$
19)	2	20)	$\frac{1}{2}$	21)	an infinite
22)	-2	23)	P (A)	24)	$\mathbb{R}-\{3,-3\}$
25)	$\{-2\}$	26)	$(2,1)$	27)	-1
28)	$\frac{1}{2}$	29)	$\mathbb{R}-\{1\}$	30)	$\frac{5}{6}$
31)	$\frac{1}{2}$	32)	12	33)	$\{3\}$
34)	$(0,0)$	35)	A , B mutually exclusive	36)	3 , 4
37)	0 . 2	38)	ZERO	39)	$\mathbb{R}-\{2\}$
40)	$\{(2,2),(-2,-2\}$	41)	$\{5,4\}$	42)	-1
43)	$\mathbb{R}-\{0\}$	44)	$\emptyset$	45)	$\mathbb{R}-\{0,1\}$
46)	$(2,3)$	47)	0 %	48)	P (A)
49)	x^2-1	50)	$\mathbb{R}-\{-2,2\}$	51)	-8
52)	$(4,1)$	53)	$\{(-3,3)\}$	54)	0.5
55)	$\mathbb{R}-\{2,5\}$	56)	$\{(3,3),(-3,-3)\}$	57)	$\{-7\}$
58)	0.4	59)	$\{(-4,4)\}$	60)	second

1) (a) $n(x) = \frac{3x-4}{(x-3)(x-2)} + \frac{2(x+3)}{(x-2)(x+3)}$

$\therefore$ the domain of $n = \mathbb{R} - \{3, 2, -3\}$

, $n(x) = \frac{3x-4}{(x-3)(x-2)} + \frac{2}{x-2}$

$= \frac{3x-4+2x-6}{(x-3)(x-2)} = \frac{5x-10}{(x-3)(x-2)}$

$= \frac{5(x-2)}{(x-3)(x-2)} = \frac{5}{x-3}$

(b) $x - 3y = 6$ (1)

, $2x + y = 5$ i.e. $6x + 3y = 15$ (2)

, Adding (1) and (2) : $\therefore 7x = 21$

$\therefore x = 3$, substituting in (1)

$\therefore 3 - 3y = 6$ $\therefore -3y = 3$

$\therefore y = -1$

$\therefore$ the S.S. $= \{(3, -1)\}$

3)(a) $n(x) = \frac{x^2+x+1}{(x-3)(x+3)} + \frac{(x-1)(x^2+x+1)}{(x-1)(x-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, -3, 1\}$

$n(x) = \frac{x^2+x+1}{(x-3)(x+3)} \times \frac{(x-1)(x-3)}{(x-1)(x^2+x+1)}$

$= \frac{1}{x+3}$

(b) $\because xy + y^2 = 6$ $\therefore y(x+y) =$

, $\therefore x + y = 3$ $\therefore 3y = 6$

$\therefore y = 2$ $\therefore x = 1$

$\therefore$ The S.S. $= \{(1, 2)\}$

2) (a) $\because x^2 - 5x + 3 = 0$

$\therefore a = 1, b = -5$ and $c = 3$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 3}}{2 \times 1}$

$\therefore x \simeq 4.3$ or $x \simeq 0.7$

$\therefore$ the S.S. $= \{4.3, 0.7\}$

(b) Let the length be x cm. and the width be y cm.

$\therefore 2(x + y) = 14$ $\therefore x + y = 7$

$\therefore x = 7 - y$ (1)

, $xy = 12$, substituting by (1)

$\therefore (7 - y)y = 12$ $\therefore 7y - y^2 = 12$

$\therefore y^2 - 7y + 12 = 0$

$\therefore (y - 3)(y - 4) = 0$

$\therefore y = 3$, from (1) : $\therefore x = 4$

or $y = 4$, from (1) : $\therefore x = 3$

$\therefore$ The two dimensions are 3 cm. and 4 cm.

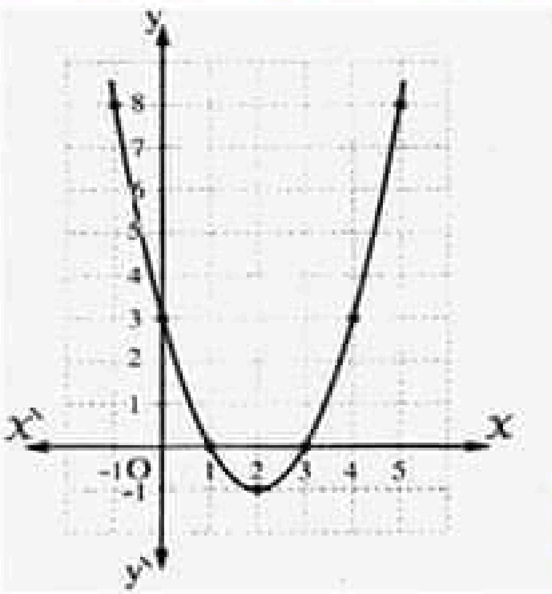
4) (a) (1) $P(\acute{A}) = 1 - P(A) = 1 - 0.7 = 0.3$

(2) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.7 + 0.4 - 0.2 = 0.9$

(b) $f(x) = x^2 - 4x + 3$

X	-1	0	1	2	3	4	5
y	8	3	0	-1	0	3	8



From the graph:

- The vertex point is $(2, -1)$

- The minimum value $= -1$

The S.S. of the equation: $x^2 - 4x + 3 = 0$

is $\{1, 3\}$

5) (a) $2x - y = -3$ (1) , $x + 2y = -4$

i.e. $2x + 4y = -8$ (2)

Subtracting (1) from (2) : $\therefore 5y = -5$

$\therefore y = -1$ Subtracting in (1)

$\therefore x = -2$ $\therefore$ The S.S. $= \{(-2, -1)\}$

(b) Let the two numbers be x and y where $x > y$

$\therefore x - y = 5$ i.e. $x = 5 + y$ (1)

, $xy = 36$, from (1):

$\therefore (5 + y)y = 36$ $\therefore 5y + y^2 = 36$

$\therefore y^2 + 5y - 36 = 0$ $\therefore (y + 9)(y - 4) = 0$

$\therefore y = -9$ and hence $x = -4$

or $y = 4$ and hence $x = 9$

6) (a) (1) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.6 + 0.3 - 0.2 = 0.7$

(2) $P(A - B) = P(A) - P(A \cap B)$

$= 0.6 - 0.2 = 0.4$

(b) $n(x) = \frac{3x}{x(x-2)} - \frac{12}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, 2, -2\}$

, $n(x) = \frac{3}{x-2} - \frac{12}{(x-2)(x+2)}$

$= \frac{3x+6-12}{(x-2)(x+2)} = \frac{3x-6}{(x-2)(x+2)}$

$= \frac{3(x-2)}{(x-2)(x+2)} = \frac{3}{x+2}$

7) (a) $3x + 4y = 24$ (1)

$\therefore x - 2y = -2$ i.e. $2x - 4y = -4$ (2)

, Adding (1) and (2) : $\therefore 5x = 20$ $\therefore x = 4$

, Substituting in (1) : $\therefore y = 3$

$\therefore$ The S.S. $= \{(4, 3)\}$

(b) $\because 3x^2 - 6x + 1 = 0$

$\therefore a=3$, $b = -6$ and $c = 1$

$\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{6 \pm \sqrt{24}}{6}$

$\therefore x \simeq 1.82$ or $x \simeq 0.18$

$\therefore$ The S.S. $= \{1.82, 0.18\}$

9)(a) $\because x^2 - 2x - 4 = 0$

$\therefore a = 1$, $b = -2$ and $c = -4$

$\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{2 \pm \sqrt{20}}{2}$

$\therefore x \simeq 3.2$ or $x \simeq -1.2$

$\therefore$ The S.S. $= \{3.2, -1.2\}$

(b) $n(x) = \frac{x^2+x+1}{x} \times \frac{x(x-1)}{(x-1)(x^2+x+1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, 1\}$

, $n(x) = 1$

8)(a) $n(x) = \frac{(x-2)(x-1)}{(x-7)(x+7)} \div \frac{x-2}{x+7}$

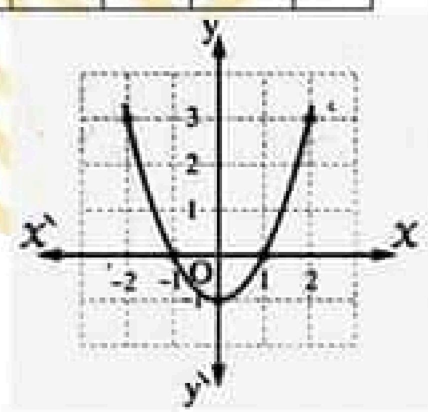
$\therefore$ The domain of $n = \mathbb{R} - \{7, -7, 2\}$

,$n(x) = \frac{(x-2)(x-1)}{(x-7)(x+7)} \times \frac{(x+7)}{(x-2)}$

,$n(x) = \frac{x-1}{x-7}$

(b) $f(x) = x^2 - 1$

x	-2	-1	0	1	2
y	3	0	-1	0	3



(1) The vertex point $= (0, -1)$

(2) The minimum value $= -1$

(3) The two roots of the equation :

$F(x) = 0$ are $-1, 1$

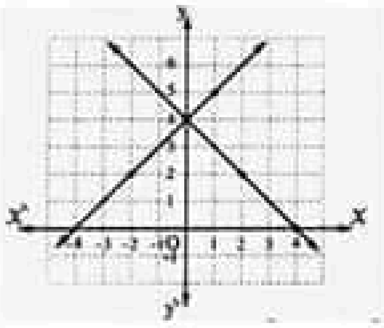
10)(a) Graphically:

$y = x + 4$

X	0	1	-2
y	4	5	2

, $y = 4 - x$

X	0	2	4
y	4	2	0



From the graph : The S.S. = {(0 , 4)}

(b) $n(x) = \frac{(x-2)(x+2)}{(x+2)(x+1)} \times \frac{x(x-2)}{(x-2)(x+1)}$

$\therefore$ The domain of n = $\mathbb{R} - \{-2, -1, 2\}$

, $n(x) = \frac{x-2}{x+1} - \frac{x}{x+1} = \frac{-2}{x+1}$

, $n(1) = \frac{-2}{2} = -1$

11) (a) $\frac{1}{6}$

(b) $\because y = x + 2$ (1)

, Substituting in the other equation

$\therefore x^2 + x(x+2) - 4 = 0$

$\therefore x^2 + x^2 + 2x - 4 = 0$

$\therefore 2x^2 + 2x - 4 = 0$ $\therefore x^2 + x - 2 = 0$

$\therefore (x+2)(x-1) = 0$

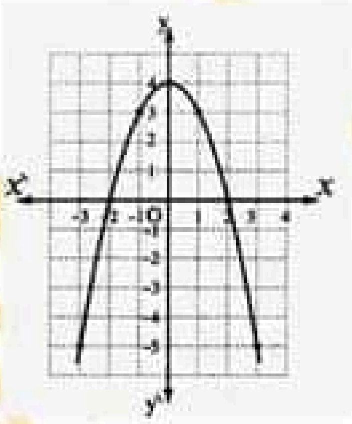
$\therefore x = -2$ and hence $y = 0$

or $x = 1$ and hence $y = 3$

$\therefore$ The S.S. = {(−2 , 0), (1 , 3)}

12)(a) $f(x) = 4 - x^2$

X	-3	-2	-1	0	1	2	3
y	-5	0	3	4	3	0	-5



(1) Roots of the equation : $f(x) = 0$ *are* $-2, 2$

(2) The axis of symmetry is : $x = 0$

(b) $\because L - W = 4$ (1) , $\because 2(L + W) = 28$

$\therefore L + W = 14$ (2)

, Adding (1) and (2) : $\therefore 2L = 18$

$\therefore L = 9$, then $W = 5$

$\therefore$ Area of the rectangle = $L \times W = 9 \times 5 =$ 45 cm^2.

13)(a) $y = 3 + x$ (1) , Substituting in the other equation

$\therefore x^2 - 2x + 3(3 + x) = 15$

$\therefore x^2 - 2x + 9 + 3x = 15 \quad \therefore x^2 + x - 6 = 0$

$\therefore (x - 2)(x + 3) = 0$

$\therefore x = 2$ and hence $y = 5$

or $x = -3$ and hence $y = 0$

$\therefore$ The S.S. $= \{(2, 5), (-3, 0)\}$

(b) $n(x) = \frac{(x-1)^2}{(x-1)(x^2+x+1)} \div \frac{x-1}{x^2+x+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

$, n(x) = \frac{(x-1)^2}{(x-1)(x^2+x+1)} \div \frac{x^2+x+1}{x-1}$

$\therefore n(x) = 1$

14) (a) $\because 3x^2 - 5x + 1 = 0$

$\therefore a = 3, b = -5$ and $c = 1$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$

$\therefore x \simeq 1.43$ or $x \simeq 0.23$

$\therefore$ The S.S. $= \{1.43, 0.23\}$

(b) Let the length be x cm. and the width be y cm.

$\therefore x - y = 3$ (1)

$, 4y - 2x = 2 \quad \therefore 2y - x = 1$ (2)

, Adding (1) and (2) : $\therefore y = 4 \quad \therefore x = 7$

$\therefore$ The length = 7 cm. , the width = 4cm.

15)(a) $2x - y = 3$ (1)

$, x + 3y = 5$ i.e. $2x + 6y = 10$

Substituting (1) from (2) : $\therefore 7y = 7$

$\therefore y = 1$ and hence $x = 2$

$\therefore$ The S.S. $\{(2, 1)\}$

(b) $n(x) = \frac{2(x+3)}{(x-2)(x+3)} + \frac{3x-4}{(x-2)(x-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -3, 3\}$

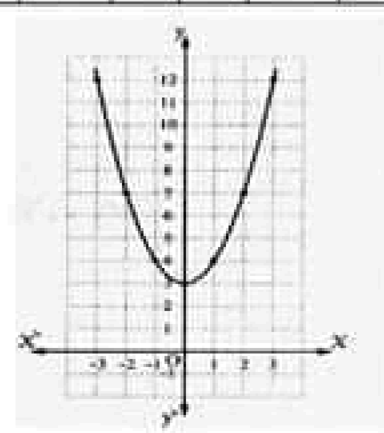
$, n(x) = \frac{2}{x-2} + \frac{3x-4}{(x-2)(x-3)}$

$= \frac{2x-6+3x-4}{(x-2)(x-3)} = \frac{5x-10}{(x-2)(x-3)}$

$= \frac{5(x-2)}{(x-2)(x-3)} = \frac{5}{x-3}$

16)(a) $f(x)\ x^2 + 3$

X	-3	-2	-1	0	1	2	3
y	12	7	4	3	4	7	12



(1) The S.S. of the equation: $f(x) = 0$ is $\emptyset$

(2) The equation of the axis of symmetry is : $x = 0$

16) (b) $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore \frac{2}{3} = \frac{4}{9} + \frac{1}{3} - P(A \cap B)$

$\therefore P(A \cap B) = \frac{1}{9}$

17) (a) $n(x) = \frac{(x-2)(x+2)}{(x+2)(x+1)} \div \frac{x(x-2)}{(x-2)(x+1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2, -1, 0, 2\}$

$, n(x) = \frac{(x-2)(x+2)}{(x+2)(x+1)} \times \frac{(x-2)(x+1)}{x(x-2)} = \frac{x-2}{x}$

(b) Let the measure of the two angle are

x and y where : $x > y$

$\therefore x + y = 90^\circ$ (1) $x - y = 40^\circ$ (2)

, Adding (1) and (2) : $\therefore 2x = 130^\circ$

$\therefore x = 65^\circ, y = 25^\circ$

$\therefore$ The measure of the two angle are

65° and 25°

18)(a) $x = 7 - y$ (1) , Substituting in the other equation

$\therefore (7-y)^2 + y^2 = 25$ $\therefore 49 - 14y + y^2 + y^2 = 25$

$\therefore 2y^2 - 14y + 24 = 0$

$\therefore y^2 - 7y + 12 = 0$ $\therefore (y-3)(y-4) = 0$

$\therefore y = 3$ and hence $x = 4$ or $y = 4$ and

hence $x = 3$

$\therefore$ The S.S. $= \{(4, 3), (3, 4)\}$

(b) $\because x(x+2) = 1$ $\therefore x^2 + 2x - 1 = 0$

$\therefore a = 1, b = 2$ and $c = -1$

$\therefore x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(-1)}}{2 \times 1} = \frac{-2 \pm \sqrt{8}}{2}$

$\therefore x \simeq 0.41$ or $x \simeq -2.41$

$\therefore$ The S.S. $= \{0.41, -2.41\}$

19) (a) $x - 2y = 0$ (1) , $2x - y = 3$

i.e. $-4x + 2y = -6$

, Adding (1) and (2) : $\therefore -3x = -6$

$\therefore x = 2$, Substituting in (1) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(2, 1)\}$

(b) $n(x) = \frac{3}{3(2x-1)(2x+1)} - \frac{2x}{2x(2x-1)}$

$\therefore$ The domain of $n = \mathbb{R} - \left\{\frac{1}{2}, -\frac{1}{2}, 0\right\}$

$, n(x) = \frac{1}{(2x-1)(2x+1)} - \frac{1}{2x-1}$

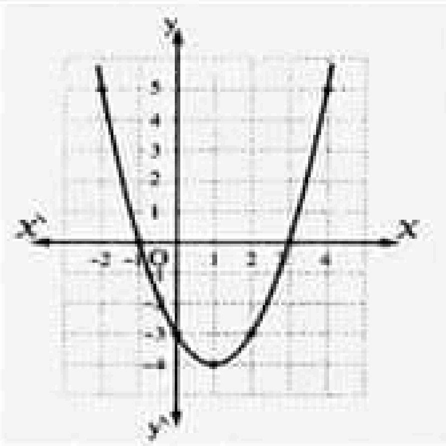
$= \frac{1-2x-1}{(2x-1)(2x+1)} = \frac{-2x}{(2x-1)(2x+1)}$

, n (0) is undefined.

20)(a) (1) $\frac{3}{10}$ (2) $\frac{1}{10}$

(b) $f(x) = x^2 - 2x - 3$

X	-2	-1	0	1	2	3	4
y	5	0	-3	-4	-3	0	5



(1) The vertex of the curve is $(1, -4)$

(2) The minimum value of the function is -4

(3) The two roots of the equation : $f(x) = 0$

are $-1, 3$

21)(a) $x + y = 4$ (1) , $2x - y = 2$ (2)

, Adding (1) and (2):

$\therefore 3x = 6$

$\therefore x = 2$, Substituting in (1)

$\therefore y = 2$ $\therefore$ The S.S. $= \{(2, 2)\}$

(b) Let the two integers x and y

$\therefore x + y = 9$ i.e. $x = 9 - y$ (1)

, $x^2 - y^2 = 27$ (2)

Substituting from (1) in (2) :

$\therefore (9 - y)^2 - y^2 = 27$

$\therefore 81 - 18y + y^2 - y^2 = 27$ $\therefore 18y = 54$

$\therefore y = 3$ and hence $x = 6$

$\therefore$ The two integers are : 6 and 3

22)(a) $n(x) = \frac{x-1}{(x-1)(x+1)} \div \frac{x(x-5)}{(x-5)(x+1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{1, -1, 0, 5\}$

, $n(x) = \frac{1}{x+1)} \times \frac{x+1}{x} = \frac{1}{x}$

(b) $x = 1 + y$ (1) , Substituting in the other equation

$\therefore (1 + y)^2 + y^2 = 13$

$\therefore 1 + 2y + y^2 + y^2 = 13$ $\therefore 2y^2 + 2y - 12 = 0$

$\therefore y2 + y - 6 = 0$ $\therefore (y + 3)(y - 2) = 0$

$\therefore y = -3$ and hence $x = -2$

or $y = 2$ and hence $x = 3$

$\therefore$ The S.S. $= \{(-2, -3), (3, 2)\}$

23)(a) $\because x^2 - 4x + 1 = 0$

$\therefore a = 1, b = -4$ and $c = 1$

$\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{4 \pm \sqrt{12}}{2}$

$\therefore x \simeq 3.73$ or $x \simeq 0.27$

$\therefore$ The S.S. $= \{3.73, 0.27\}$

(b) $n(x) = \frac{x^2 - 2x + 4}{x^3 + 8} + \frac{x^2 - x - 2}{x^2 - 4}$

$= \frac{x^2 - 2x + 4}{(x+2)(x^2 - 2x + 4)} + \frac{(x-2)(x+1)}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2, 2\}$

$, n(x) = \frac{1}{x+2} + \frac{x+1}{x+2} = \frac{x+2}{x+2} = 1$

---

25) (a) $(x) = \frac{(x-1)(x+1)}{(x+2)(x+1)} \div \frac{x(x-1)}{x(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2, -1, 0, 1\}$

$, n(x) = \frac{x-1}{x+2} \times \frac{x+2}{x-1} = 1$

(b) Graphically :

From the graph : The S.S. $= \{(2, 3)\}$

Algebraically :

$Y = x + 1$ (1) , Substituting in the other equation

$\therefore x + 1 = 2x - 1$

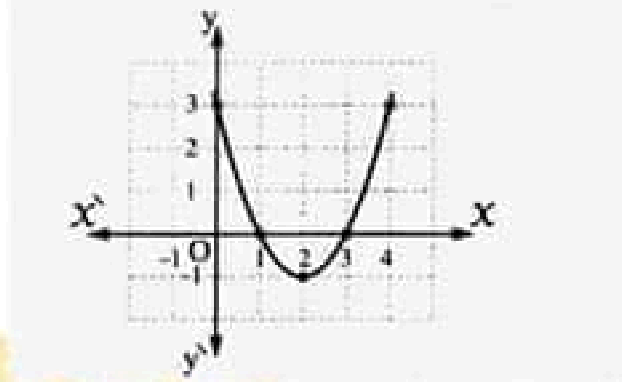
$\therefore x = 2$, Substituting in (1): $\therefore y = 3$

$\therefore$ The S.S. $= \{(2, 3)\}$

24)(a) (1) $\frac{2}{5}$ (2) $\frac{3}{5}$ (3) $\frac{13}{20}$

(b) $f(x) = x^2 - 4x + 3$

x	0	1	2	3	4
y	3	0	−1	0	3



From the graph:

(1) The minimum value = - 1

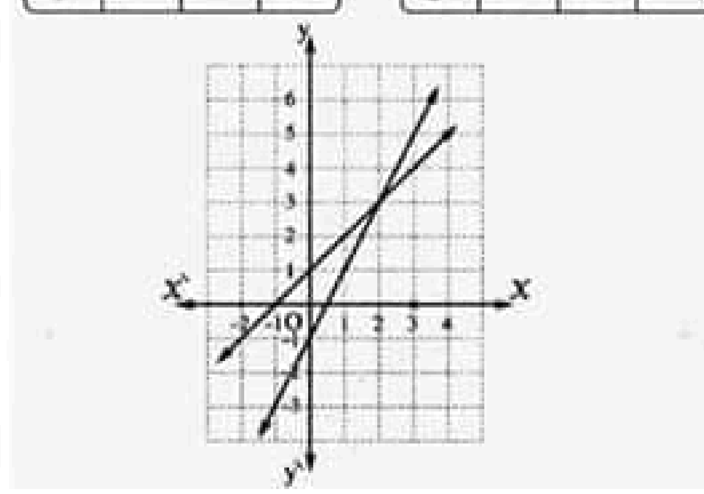
(2) The S.S. of the equation:

$X^2 - 4x + 3 = 0$ is $\{1, 3\}$

$y = x + 1$, $y = 2x - 1$

x	−1	0	1
y	0	1	2

x	0	2	3
y	−1	3	5



26)(a) $\because L - W = 2$ (1) , $2(L + W) = 3$

i.e. $L + W = 16$ (2)

, Adding (1) and (2) : $\therefore 2L = 18$

$\therefore L = 9 , W = 7$

$\therefore$ Area of the rectangle $= 9 \times 7 = 63 \text{cm}^2$.

(b)(1) $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore 0.8 = 0.5 + X - 0.1 \quad \therefore X = 0.4$

(2) $\because A \subset B$, then $P(A \cup B) = P(B) = X$

$\therefore X = 0.8$

28)(a) $\because y = x + 2$, Substituting in the other equation

$\therefore x^2 + x(x+2) - 4 = 0$

$\therefore x^2 + x^2 + 2x - 4 = 0$

$\therefore 2x^2 + 2x - 4 = 0$

$\therefore x^2 + x - 2 = 0 \quad \therefore (x-1)(x+2) = 0$

$\therefore x = 1$ and hence $y = 3$

or $x = -2$ and hence $y = 0$

$\therefore$ The S.S. $= \{(1,3), (-2,0)\}$

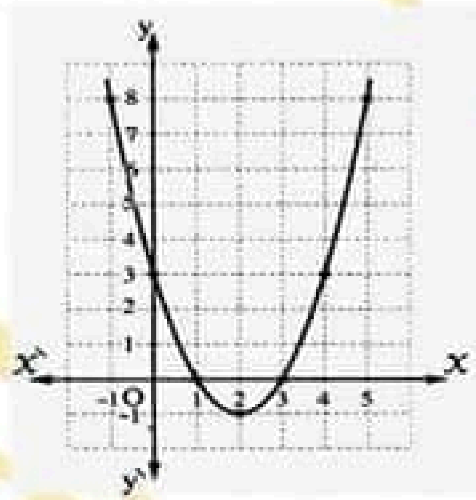
(b) $n(x) = \frac{3(x-5)}{(x-3)(x-5)} + \frac{(x-6)(x+3)}{(x-3)(x+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, 5, -3\}$

, $n(x) = \frac{3}{x-3} \times \frac{x-6}{x-3} = \frac{x-3}{x-3} = 1$

27) (a) $f(x) = x^2 - 4x + 3$

X	-1	0	1	2	3	4	5
y	8	3	0	-1	0	3	8



From the graph:

(1) The minimum value of the function = -1

(2) The equation of the axis of symmetry is: $x = 2$

(3) The S.S. of the equation : $f(x) = 0$ is $\{1, 3\}$

(b) $\because 3x^2 - 5x + 1 = 0$

$\therefore a = 3 , b = -5$ and $c = 1$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$

$\therefore x \simeq 1.43$ or $x \simeq 0.23$

$\therefore$ The S.S. $= \{1.43, 0.23\}$

29)(a) $n(x) = \frac{x}{x(x+2)} + \frac{x-2}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, -2, 2\}$

, $n(x) = \frac{1}{x+2} \times \frac{1}{x+2} = \frac{2}{x+2}$

, n (-2) is undefined

(b) $2(L + W) = 14 \quad \therefore L + W = 7$

$\therefore L = 7 - W$

, $\because L^2 + W^2 = 25$, Substituting from (1)

$\therefore (7 - w)^2 + w^2 = 25$

$\therefore 49 - 14w + w^2 + w^2 = 25$

$\therefore 2w^2 - 14w + 24 = 0$

$\therefore w^2 - 7w + 12 = 0 \quad \therefore (W-3)(W-4) = 0$

$\therefore$ W = 3 and hence L = 4

or W = 4 and hence L = 3 (refused)

$\therefore$ The length = 4 cm. and the width = 3cm.

31) (a) $\because 2x + y = 1$ (1) , $x + 2y = 5$

i.e. $-2x - 4y = -10$ (2)

, Adding (1) and (2) : $\therefore -3y = -9$

$\therefore y = 3$,from (1) : $\therefore x = -1$

$\therefore$ The S.S. $= \{(-1, 3)\}$

(b) $\because x^2 - x - 4 = 0$

$\therefore a = 1, b = -1$ and $c = -4$

$\therefore x = \frac{1 \pm \sqrt{(-1)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{1 \pm \sqrt{17}}{2}$

$\therefore x \simeq \frac{1+4.12}{2}$ or $\simeq \frac{1-4.12}{2}$

i.e. $x \simeq 2.56$ or $x \simeq 1.56$

30)(a) $n(x) = \frac{(x-7)(x+7)}{(x-2)(x^2+2x+4)} \div \frac{x+7}{x-2}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -7\}$

, $n(x) = \frac{(x-7)(x+7)}{(x-2)(x^2+2x+4)} \times \frac{x-2}{x+7}$

$= \frac{x-7}{x^2+2x+4)}$

(b) $\because x - y = 0$

i.e. x = y , Substituting in the other equation

$\therefore x^2 = 9$

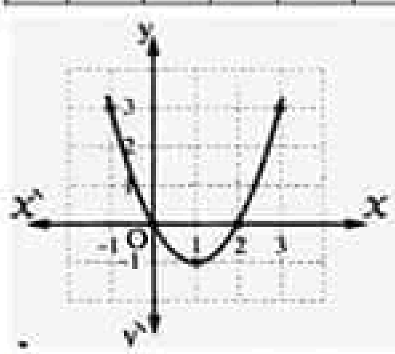
$\therefore$ x = 3 and hence y = 3

or x = - 3 and hence y = - 3

$\therefore$ The S.S. $= \{(3, 3), (-3, -3)\}$

32) (a) $f(x) = x^2 - 2x$

x	-1	0	1	2	3
y	3	0	-1	0	3



From the graph:

The S.S. of the equation : $f(x) = 0$ is $\{0, 2\}$

(b) $P(\grave{A}) = 1 - P(A) = 1 - \frac{3}{8} = \frac{5}{8}$

, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore \frac{5}{8} = \frac{3}{8} + \frac{1}{2} - P(A \cap B)$

$\therefore P(A \cap B) = \frac{1}{4}$

33) (a) $n(x) = \frac{x^2-2x+4}{(x+2)(x^2-2x+4)} + \frac{(x-2)(x+1)}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2, 2\}$

, $n(x) = \frac{1}{x+2} + \frac{x+1}{x+2} = \frac{x+2}{x+2} = 1$

(b) $L - W = 4$ (1) , $2(L+W) = 28$

, Adding (1) and (2) : $\therefore 2L = 18$

$\therefore L = 9$ and $W = 5$

$\therefore$ Area of the rectangle $= L \times W = 45\text{cm}^2$.

35)(a) $\because x2 + x - 3 = 0 \quad \therefore a = 1, b = 1$ and $c = -3$

$\therefore x = \frac{-1 \pm \sqrt{(-1)^2 - 4 \times 1 \times -3}}{2 \times 1} = \frac{-1 \pm \sqrt{13}}{2}$

$\therefore x \simeq 1.3$ or $x \simeq 2.3$

(b) $n(x) = \frac{(x-2)(x^2+2x+4)}{(x+3)(x-2)} \div \frac{x^2+2x+4}{x-3}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 2, 3\}$

, $n(x) = \frac{x+2x+4}{x+3} \times \frac{x-3}{x^2+2x+4} = \frac{x-3}{x+3}$

34)(a) $x - 2y = 4$ (1)

, $3x + y = 5$ i.e. $6x + 2y = 10$ (2)

, Adding(1)and(2): $\therefore 7x = 14 \therefore x = 2 \therefore y = -1$

$\therefore$ The S.S. $= \{(2, -1)\}$

(b) $\because x = y + 2$ (1) , Substituting in the other equation

$\therefore (y+2)^2 + (y+2)y = 0$

$\therefore y^2 + 4y + 4 + y^2 + 2y = 0$

$\therefore 2y^2 + 6y + 4 = 0 \quad \therefore y^2 + 3y + 2 = 0$

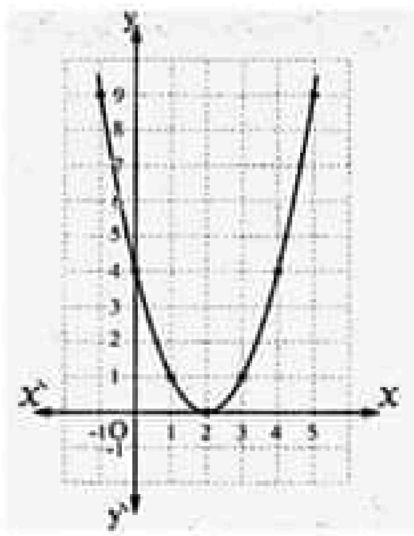
$\therefore (y+2)(y+1) = 0 \quad \therefore y = -2$ and hence $x = 0$

or $y = -1$ and hence $x = 1$

$\therefore$ The S.S. $= \{(0, -2), (1, -1)\}$

36)(a) $f(x) = (x-2)^2$

X	-1	0	1	2	3	4	5
y	9	4	1	0	1	4	9



(b) $\because$ A and B are two mutually exclusive

$\therefore P(A \cup B) = P(A) + P(B)$

$\therefore 0.9 = 0.5 + x \qquad \therefore x = 0.4$

37) (a) $n(x) = \frac{(x-1)(x+3)}{x+3} \div \frac{(X-1)(X+1)}{x+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 1, -1\}$

, $n(x) = (x-1) \times \frac{1}{(x-1)} = 1$

(b) $y = 2 + x$ (1) , Substituting in the other equation

$x^2 + x(2+x) - 4 = 0$

$\therefore x^2 + 2x + x^2 - 4 = 0$ $\therefore 2x^2 + 2x - 4 = 0$

$\therefore x^2 + x - 2 = 0$ $\therefore (x+2)(x-1) = 0$

$\therefore x = -2$ and hence $y = 0$ or $x = 1$ and hence $y = 3$

$\therefore$ The S.S. $= \{(-2, 0), (1, 3)\}$

39) (a) $n(x) = \frac{x}{x(x+2)} + \frac{x-2}{(x+2)(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, -2, 2\}$

, $n(x) = \frac{1}{x+2} \times \frac{1}{x+2} = \frac{2}{x+2}$

(b) $x + y = 7$ (1) , $5x - y = 5$ (2)

, Adding (1) and (2) : $\therefore 6x = 12$

$\therefore x = 2$, Substituting in (1) : $\therefore y = 5$

$\therefore$ The S.S. $= \{(2, 5)\}$

38) (a) Let the unite digit is x and the tens digit is y

$\therefore x + y = 11$ (1) , $2x - 3y = 2$ (2)

Multiplying (1) by 2 : $\therefore 2x + 2y = 22$ (3)

, Substituting (2) from (3) : $\therefore 5y = 20$

$\therefore y = 4$ $\therefore x = 7$ $\therefore$ The number is 47

(b) $\because x^2 - 4x + 1 = 0$ $\therefore a = 1$, $b = -4$ and $c = 1$

$\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{4 \pm \sqrt{12}}{2}$

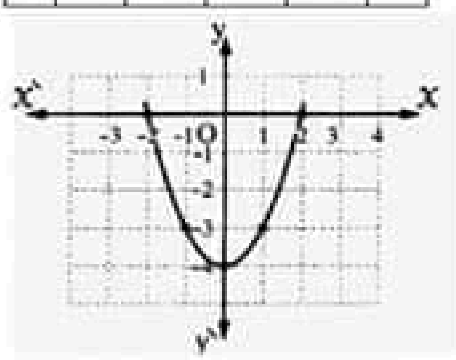
$\therefore x \simeq 3.73$ or $x \simeq 0.27$

$\therefore$ The S.S. $= \{3.73, 0.27\}$

40) (a) (1) $\frac{1}{5}$ (2) $\frac{3}{10}$

(b) $f(x) = x^2 - 4$

X	-2	-1	0	1	2
y	0	-3	-4	-3	0



From the graph

- The minimum value of the function is : - 4

- The set of zeroes of the function is :

$\{(-2, 2)\}$

FIRST: ALGEBRA

Choose the correct answer :

1. The domain of the function n : n $(x) = \frac{x}{x-1}$ is ....

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{0 , 1\}$ (d) $\mathbb{R} - \{-1\}$

2. The number of solutions of the two equations : $x + y = 2$ and $y + x = 3$ together in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero (b) 1 (c) 2 (d) 3

3. If $x \neq 0$, then $\frac{5x}{x^2+1} \div \frac{x}{x^2+1} =$ ....

(a) -5 (b) -1 (c) 1 (d) 5

4. If the ratio between the perimeters of two squares is 1 : 2 , then the ratio between their areas = ... : ....

(a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1

5. The equation of the symmetric axis of the curve of the function f where $f(x) = x^2 - 4$ is ....

(a) $x = -4$ (b) $x = 0$ (c) $y = 0$ (d) $y = -4$

6. If $A \subset S$ of random experiment and $P(\grave{A}) = 2\,P(A)$, then $P(A) =$ ....

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) 1

7. The solution set of the two equations : $x = 3$, $y = 4$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(3 , 4)\}$ (b) $\{(4 , 3)\}$ (c) $\mathbb{R}$ (d) $\varnothing$

8. The set of zeroes of the function f where $f(x) = x^2 + 4$ in $\mathbb{R}$ is ....

(a) $\{2\}$ (b) $\{2 , -2\}$ (c) $\mathbb{R}$ (d) $\varnothing$

9. If A and B are two mutually exclusive events of a random experiment , then $P(A \cap B) =$ ....

(a) 0 (b) 1 (c) 0.5 (d) $\varnothing$

10. The domain of the multiplicative inverse of the function $f : f(x) = \frac{x+2}{x-3}$ is ....

(a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{-2 , 3\}$ (c) $\mathbb{R} - \{-3\}$ (d) $\mathbb{R}$

11. The two straight lines : $3x + 5y = 0$, $5x - 3y = 0$ are intersect in ....

(a) first quadrant. (b) second quadrant. (c) the origin point. (d) fourth quadrant.

12. If $P(A) = 0.6$, then $P(\acute{A}) =$ ....

(a) 0.4 (b) 0.6 (c) 0.5 (d) 1

13. The solution set of the two equations : $x = 2$ and $xy = 6$ is ....

(a) $\{(2 , 3)\}$ (b) $\{2 , 3\}$ (c) $\{(3 , 2)\}$ (d) $\{3\}$

14. The domain of the additive inverse of the fraction $n : n(x) = \frac{x-2}{x-5}$ is ....

(a) $\mathbb{R} - \{2\}$ (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R} - \{2 , 5\}$ (d) $\{2 , 5\}$

15. The multiplicative inverse of the algebraic fraction $\frac{3}{x^2+1}$ is ....

(a) $\frac{-3}{x^2+1}$ (b) $\frac{x^2+1}{-3}$ (c) $\frac{x^2+1}{3}$ (d) $\frac{x^2-1}{3}$

16. The domain of the fraction $n : n(x) = \frac{x+2}{x-1}$ is ....

(a) $\mathbb{R} - \{-2\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{1 , -2\}$ (d) $\mathbb{R} - \{2\}$

17. If $y = 2$ and $x^2 - y^2 = 5$, then $x =$ ....

(a) -3 (b) 3 (c) ± 3 (d) 9

18. The two straight lines : $x + 2y = 1$ and $2x + 4y = 6$ are ....

(a) parallel (b) intersecting (c) perpendicular (d) coincide

19. The set of zeroes of the function f : where $f(x) = -3x$ is ....

(a) $\{0\}$ (b) $\{3\}$ (c) $\{-3\}$ (d) $\mathbb{R} - \{3\}$

20. If $A \subset S$ of a random experiment , $P(A) = P(\acute{A})$, then $P(A) =$ ....

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{1}{8}$

21. If x is a negative number, then the greatest number of the following is ....

(a) $5x$ (b) $\frac{5}{x}$ (c) $5 + x$ (d) $5 - x$

22. The domain of the function $f : f(x) = \frac{x-3}{4}$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{-4\}$ (c) $\mathbb{R} - \{-4, 3\}$ (d) $\varnothing$

23. If the sum of ages of a father and his sun now is 47 years , then the sum of their ages after 10 years = ... years.

(a) 27 (b) 37 (c) 57 (d) 67

24. If A , B are two mutually exclusive events , $P(B) = 0.5$ and $P(A \cup B) = 0.7$, then $P(A) =$ ....

(a) 0.02 (b) 0.2 (c) 0.5 (d) 0.13

25. $(x + 1)^2 =$ ....

(a) $x^2 + 1$ (b) $x^2 - 1$ (c) $x^2 - x + 1$ (d) $x^2 + 2x + 1$

26. The additive inverse of the fraction $\frac{3}{x^2 + 1}$ is ....

(a) $\frac{-3}{x^2 + 1}$ (b) $\frac{x^2 + 1}{3}$ (c) $\frac{x^2 + 1}{-3}$ (d) $\frac{3}{x^2 - 1}$

27. If x is a negative real number , then the greatest number of the following numbers is ....

(a) $3 + x$ (b) $3x$ (c) $3 - x$ (d) $\frac{3}{x}$

28. If $x = 2$ and $y = 3$, then $(y - 2x)^{10} =$ ....

(a) 10 (b) -1 (c) -10 (d) 1

29. The point of intersection of the two straight lines $x = 2$ and $x + y = 6$ is ....

(a) (2 , 6) (b) (2 , 4) (c) (4 , 2) (d) (6 , 2)

30. Twice the number x subtracted by 3 is ....

(a) $x - 3$ (b) $2x + 3$ (c) $2x - 3$ (d) $3 - 2x$

31. The domain of the function f where $f(x) = \frac{x+2}{5x}$ is ....

(a) $\mathbb{R} - \{5\}$ (b) $\mathbb{R} - \{-5\}$ (c) $\mathbb{R}$ (d) $\mathbb{R} - \{\text{zero}\}$

32. If $P(A) = 4\,P(\grave{A})$, then $P(A) =$ ....

(a) 0.8 (b) 0.6 (c) 0.4 (d) 0.2

33. If x is a negative number , then the greatest number of the following is ....

(a) $5 - x$ (b) $5 + x$ (c) $\frac{5}{x}$ (d) $5x$

34. If $2^7 \times 3^7 = 6^k$, then $k =$ ....

(a) 14 (b) 7 (c) 6 (d) 5

35. If $x^2 - y^2 = 2(x + y)$ where $(x + y) \neq \text{zero}$, then $(x - y) =$ ....

(a) 2 (b) 4 (c) 6 (d) 8

36. In the experiment of rolling a regular die once , the probability of appearance of an even number on the upper face = ...

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{5}{6}$

37. The set of zeroes of the function $f : f(x) = x^2 + 1$ is ....

(a) $\{1\}$ (b) $\{-1\}$ (c) $\{-1 , 1\}$ (d) $\varnothing$

38. The point of intersection of the two straight lines $x + 2 = 0$ and $y - 3 = 0$ is ....

(a) $(-2 , -3)$ (b) $(-2 , 3)$ (c) $(2 , -3)$ (d) $(2 , 3)$

39. If $2^5 \times 3^5 = m \times 6^4$, then $m =$ ....

(a) 1 (b) 2 (c) 3 (d) 6

40. The domain of the multiplicative inverse of the algebraic fraction $\frac{x+2}{x+5}$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{-5\}$ (c) $\mathbb{R} - \{-2\}$ (d) $\mathbb{R} - \{-2 , -5\}$

Essay problems:

1. **By using the general formula , find in $\mathbb{R}$ the solution set of the equation :**
$2x^2 - 5x + 1 = 0$ "approximate the result to the nearest one decimal".

2. **Find n (x) in the simplest form showing the domain where :**
$n(x) = \frac{x-3}{x^2 - 7x + 12} - \frac{4}{x^2 - 4x}$

3. **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**
$x - y = 0$ and $x^2 + xy + y^2 = 27$

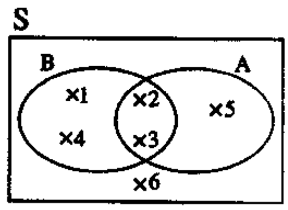
4. **Find n (x) in the simplest form showing the domain where :**
$n(x) = \frac{x^2 + 4x + 3}{x^3 - 27} \div \frac{x+3}{x^2 + 3x + 9}$ then find n (2) , n (– 3) if possible.

5. A rectangle with a length more than its width by 4 cm. If the perimeter of the rectangle is 28 cm. , find the area of the rectangle.

6. If $n(x) = \frac{x^2 - 2x}{x^2 - 3x + 2}$,
(1) Find $n^{-1}(x)$ in simplest form showing the domain of n^{-1}
(2) If $n^{-1}(x) = 3$, then find the value of x

7. If $n_1(x) = \frac{x^2}{x^3 - x^2}$ and $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$ **, then prove that :** $n_1 = n_2$

8. **In the opposite figure :**
If A and B are two events in a sample space S
of a random experiment **, then find :**
(1) P (A ∩ B)　　　(2) P (A – B)
(3) The probability of non-occurrence of the event A



9. **Find in $\mathbb{R}$ the solution set of the equation : $3x^2 - 5x + 1 = 0$**
by using the formula "approximate the result to the nearest two decimal places".

10. **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $x - y = 1$, $x^2 + y^2 = 25$

11.	**Simplify :** $n(x) = \frac{x^3 - 8}{x^2 + x - 6} \times \frac{x + 3}{x^2 + 2x + 4}$, showing the domain of n.
12.	If A and B are two events of a random experiment and $P(A) = 0.3$, $P(B) = 0.6$, $P(A \cap B) = 0.2$ **Find :** (1) $P(A \cup B)$ (2) $P(A - B)$
13.	**Solve the following two equations in $\mathbb{R} \times \mathbb{R}$:** $2x - y = 3$, $x + 2y = 4$
14.	**Simplify :** $n(x) = \frac{x^2 + 3x}{x^2 - 9} \div \frac{2x}{x + 3}$, showing the domain of n.
15.	**Simplify :** $n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x + 3}{x^2 - 5x + 6}$, showing the domain of n.
16.	**Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two following equations algebraically :** $x + 3y = 7$, $5x - y = 3$
17.	**Find n (x) in its simplest form , showing the domain of n :** $n(x) = \frac{x^2 + x}{x^2 - 1} - \frac{x + 5}{x^2 + 4x - 5}$
18.	**Find in $\mathbb{R}$ the solution set of the following equation by using the general rule :** $x^2 - 4x + 1 = 0$ rounding the results to two decimal places.
19.	If $n_1(x) = \frac{2x}{2x + 6}$, $n_2(x) = \frac{x^2 + 3x}{x^2 + 6x + 9}$, **then prove that :** $n_1 = n_2$
20.	If A and B are two events from a sample space of a random experiment , and $P(A) = 0.7$, $P(B) = 0.6$, $P(A \cap B) = 0.4$, **then find :** (1) $P(A \cup B)$ (2) $P(A - B)$
21.	**Find n (x) in its simplest form , showing the domain of n :** $n(x) = \frac{x^3 - 8}{x^2 - 3x + 2} \times \frac{x + 1}{x^2 + 2x + 4}$

22.	**Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two following equations :** $x - y = 1$, $x^2 - y^2 = 25$
23.	If $n(x) = \frac{x^2 - 3x}{(x-3)(x^2+2)}$ **, then find :** $n^{-1}(x)$ in the simplest form , showing the domain of n^{-1}
24.	If A and B are two events of the sample space (S) of a random experiment such that : $P(A) = 0.7$, $P(A \cap B) = 0.3$ **Find :** $P(A - B)$
25.	**Find n (x) in the simplest form showing the domain of n , where :** $n(x) = \frac{x^2 + 2x + 4}{x^3 - 8} - \frac{9 - x^2}{x^2 + x - 6}$
26.	**Find the common domain of n_1 , n_2 to be equal such that :** $n_1(x) = \frac{x^2 + 3x + 2}{x^2 - 4}$, $n_2(x) = \frac{x^2 - 1}{x^2 - 3x + 2}$
27.	**Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $x + y = 7$, $x^2 + y^2 = 25$
28.	**Find n (x) in the simplest form showing the domain of n , where :** $n(x) = \frac{x}{x-2} \div \frac{x+3}{x^2 - x - 2}$
29.	**Find in $\mathbb{R}$ the solution set of the equation :** $3x^2 - 5x - 4 = 0$, by using the general rule , rounding the result to two decimal places.
30.	**Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations graphically :** $x + y = 4$, $2x - y = 2$
31.	If set of zeroes of the function $f : f(x) = a x^2 + x + b$ is $\{0 , 1\}$ find the value of each two constants a and b
32.	If $n(x) = \frac{x^3 - 8}{x^2 - x - 2} \div \frac{x^2 + 2x + 4}{2x^2 - x - 3}$ Find n (x) in its simplest form showing the domain of n
33.	**Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $2x = 1 - y$, $x + 2y = 5$ in $\mathbb{R} \times \mathbb{R}$
34.	**Find the solution set of the two equations :** $y - x = 3$, $x^2 + y^2 - xy = 13$ in $\mathbb{R}^2$

35. If A , B are two events in a random experiment , P (A) = 0.7 , P (B) = 0.6 and $P(A \cap B) = 0.4$

Find : (1) $P(A \cup B)$ (2) $P(A - B)$

36. If $n(X) = \frac{X^2 + X}{X^2 - 1} - \frac{X - 5}{X^2 - 6X + 5}$ Find n (X) in its simplest form , showing the domain of n

37. By using the formula , find in ℝ the solution set of the equation : $X^2 - 2X - 6 = 0$ (Approximate to the nearest one decimal)

38. If $n_1(X) = \frac{X^2 + 2X}{X^2 + 4X + 4}$, $n_2(X) = \frac{2X}{2X + 4}$, **prove that :** $n_1 = n_2$

39. If $n(X) = \frac{X - 2}{X + 1}$

Find : (1) The domain of n^{-1} (2) $n^{-1}(3)$

40. If $n_1(X) = \frac{X^2 - 3X + 9}{X^3 + 27}$, $n_2(X) = \frac{2}{2X + 6}$ **Prove that :** $n_1 = n_2$

Algebra

Choose

1 b	2 a	3 d	4 c
5 b	6 a	7 a	8 d
9 a	10 b	11 c	12 a
13 a	14 b	15 c	16 b
17 c	18 a	19 a	20 b
21 d	22 a	23 d	24 b
25 d	26 a	27 c	28 d
29 b	30 c	31 d	32 a
33 a	34 b	35 a	36 c
37 d	38 b	39 d	40 d

Essay problems

1 $a = 2,\ b = -5,\ c = 1$

$b^2 - 4ac = 25 - 4 \times 2 \times 1 = 17$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{5 \pm \sqrt{17}}{4}$

$x_1 = \frac{5+\sqrt{17}}{4} \simeq 2.3$, $x_2 = \frac{5-\sqrt{17}}{4} \simeq 0.2$

S.S. $= \{2.3, 0.2\}$

2 $n(x) = \frac{x-3}{(x-3)(x-4)} - \frac{4}{x(x-4)}$

$D = R - \{3, 4, 0\}$

$n(x) = \frac{1}{(x-4)} - \frac{4}{x(x-4)} = \frac{(x-4)}{x(x-4)} = \frac{1}{x}$

3 $x = y \to ①$, $x^2 + xy + y^2 = 27 \to ②$

From ① in ②

$y^2 + y^2 + y^2 = 27$

$3y^2 = 27$

$y^2 = 9$

$y = \pm 3 \quad \therefore x = \pm 3$

S.S. $= \{(3,3), (-3,-3)\}$

4 $n(x) = \frac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \div \frac{(x+3)}{(x^2+3x+9)}$

$D = R - \{3, -3\}$

$\therefore n(x) = \frac{(x+3)(x+1)}{(x-3)(\cancel{x^2+3x+9})} \times \frac{(\cancel{x^2+3x+9})}{(x+3)}$

$\therefore n(x) = \frac{x+1}{x-3}$

$n(2) = \frac{2+1}{2-3} = -3$, $n(-3)$ undefined

5 let the length is x, width is y

$x - y = 4 \to ①$

$x + y = 14 \to ②$ by adding

$\therefore 2x = 18 \quad \therefore \boxed{x = 9}$ in ②

$9 + y = 14 \quad \therefore \boxed{y = 5}$

$\therefore$ The area $= L \times w = 5 \times 9 = 45\ cm^2$

6 $n(x) = \frac{x(x-2)}{(x-2)(x-1)}$

① $n^{-1}(x) = \frac{x-1}{x}$, $D = R - \{0, 1, 2\}$

② $\frac{x-1}{x} = 3 \quad \therefore 3x = x - 1$

$2x = -1 \quad \therefore x = \frac{-1}{2}$

7 $n_1(x) = \frac{x^2}{x^2(x-1)} = \frac{1}{x-1}$, D

, $D_1 = R - \{0, 1\}$

$n_2(x) = \frac{x(x^2+x+1)}{x(x-1)(x^2+x+1)} = \frac{1}{x-1}$

, $D_2 = R - \{0, 1\}$

$\therefore n_1 = n_2$

8 ① $\frac{2}{6} = \frac{1}{3}$ ② $\frac{1}{6}$

③ $\frac{3}{6} = \frac{1}{2}$

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(9) $a=3$, $b=-5$, $c=1$

$S.S. = \{1.43 , 0.23\}$

(10) $x-y=1$ $\qquad x^2+y^2=25 \to ②$

$x = y+1 \to ①$ From ① in ②

$(y+1)^2+y^2=25$

$y^2+2y+1+y^2-25=0$

$2y^2+2y-24=0 \quad (\div 2)$

$y^2+y-12=0$

$(y-3)(y+4)=0$

$y=3$ or $y=-4$

in ①

$x=4$ or $x=-3$

$S.S. = \{(4,3) , (-3,-4)\}$

(11) $n(x) = \frac{(x-2)(x^2+2x+4)}{(x-2)(x+3)} \times \frac{(x+3)}{(x^2+2x+4)}$

$D = R - \{2,-3\}$, $n(x) = 1$

(12) ① $0.3+0.6-0.2 = 0.7$

② $0.3-0.2 = 0.1$

(13) $2x-y=3 \xrightarrow{\times 2} ①$ $\qquad x+2y=4 \to ②$

by adding $\quad 4x-2y=6 \to ③$

$5x = 10$

$\boxed{x=2}$ in ②

$\therefore 2+2y=4 \quad 2y=2 \quad \boxed{y=1}$

$\therefore S.S. = \{(2,1)\}$

(14) $n(x) = \frac{x(x+3)}{(x-3)(x+3)} \div \frac{2x}{x+3}$

$D = R - \{3,-3,0\}$

$n(x) = \frac{x}{x-3} \times \frac{x+3}{2x} = \frac{(x+3)}{2(x-3)}$

(15) $n(x) = \frac{x(\cancel{x+2})}{(x-2)(\cancel{x+2})} + \frac{(x+3)}{(x-2)(x-3)}$

$D = R - \{2,-2,3\}$

$n(x) = \frac{x(x-3)+(x+3)}{(x-2)(x-3)}$

$= \frac{x^2-3x+x+3}{(x-2)(x-3)} = \frac{x^2-2x+3}{(x-2)(x-3)}$

(16) $x+3y=7 \to ①$ $\qquad 5x-y=3 \xrightarrow{\times 3} ②$

$15x-3y=9 \to ③$ by adding

$16x = 16 \Rightarrow \boxed{x=1}$ in ①

$1+3y=7$, $3y=6$, $\boxed{y=2}$

$\therefore S.S. = \{(1,2)\}$

(17) $n(x) = \frac{x(\cancel{x+1})}{(x-1)(\cancel{x+1})} - \frac{(\cancel{x+5})}{(\cancel{x+5})(x-1)}$

$D = R - \{1,-1,-5\}$ $\quad D = \frac{x-1}{x-1} = 1$

(18) $a=1$, $b=-4$, $c=1$

$S.S. = \{3.73 , 0.27\}$

(19) $n_1(x) = \frac{2x}{2(x+3)} = \frac{x}{x+3}$, $D_1 = R - \{-3\}$

$n_2(x) = \frac{x(x+3)}{(x+3)(x+3)} = \frac{x}{x+3}$, $D_2 = R - \{-3\}$

$\therefore n_1 = n_2$

(20) ① $0.7+0.6-0.4 = 0.9$

② $0.7-0.4 = 0.3$

(21) $n(x) = \frac{(\cancel{x-2})(x^2+2x+4)}{(\cancel{x-2})(x-1)} \times \frac{x+1}{(x^2+2x+4)}$

$D = R - \{1,2\}$, $n(x) = \frac{x+1}{x-1}$

(22) $x-y=1$ $\qquad x^2-y^2=25 \to ②$

$x=y+1 \to ①$ $\qquad$ From ① in ②

$(y+1)^2-y^2=25$

$\cancel{y^2}+2y+1-\cancel{y^2}=25$

$2y=24 \Rightarrow \boxed{y=12}$ in ①

$\boxed{x=13}$

S.S. $=\{(13,12)\}$

(23) $n(x)=\dfrac{x\cancel{(x-3)}}{\cancel{(x-3)}(x^2+2)}$

$\therefore n^{-1}(x)=\dfrac{x^2+2}{x}$, $D=R-\{3,0\}$

(24) $0.7-0.3=0.4$

(25) $n(x)=\dfrac{(x^2+\cancel{2x+4})}{(x-2)(x^2+2x+4)}+\dfrac{(x-3)\cancel{(x+3)}}{(x-2)\cancel{(x+3)}}$

$=\dfrac{1+x-3}{x-2}=\dfrac{x-2}{x-2}=1,$

$D=R-\{-3,2\}$

(26) $n_1(x)=\dfrac{(x+2)(x+1)}{(x-2)(x+2)}=\dfrac{x+1}{x-2}$,

$D_1=R-\{\pm2\}$

$n_2(x)=\dfrac{(x-1)(x+1)}{(x-2)(x-1)}=\dfrac{x+1}{x-2}$

$D_2=R-\{1,2\}$

$\therefore n_1=n_2$ in the common Domain

$R-\{1,2,-2\}$

(27) $x+y=7$ $\qquad x^2+y^2=25 \to ②$

$x=7-y \to ①$ $\qquad$ From ① in ②

$(7-y)^2+y^2=25$

$49-14y+y^2+y^2-25=0$

$2y^2-14y+24=0 \quad (\div 2)$

$y^2-7y+12=0$

$(y-3)(y-4)=0$

$y=3$ $\quad$ or $\quad y=4$

in ①

$x=4$ $\qquad x=3$

S.S. $=\{(3,4),(4,3)\}$

(28) $n(x)=\dfrac{x}{x-2}\div\dfrac{(x+3)}{(x-2)(x+1)}$

$D=R-\{2,-1,-3\}$

$n(x)=\dfrac{x(x+1)}{(x+3)}$

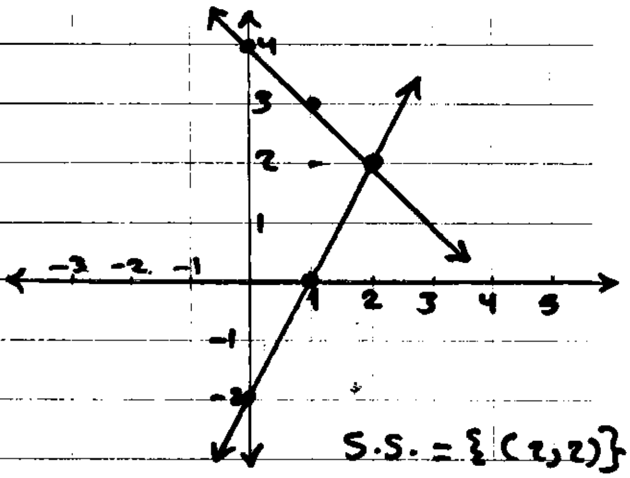
(29) $a=3$, $b=-5$, $c=-4$

S.S. $=\{2.26,-0.59\}$

(30) $y=4-x$ $\qquad y=2x-2$

x	0	1	2
y	4	3	2

x	0	1	2
y	-2	0	2



S.S. $=\{(2,2)\}$

(31) $f(1)=0$, $a+b+1=0$

$f(0)=0$, $\boxed{b=0}$ $\quad \therefore \boxed{a=-1}$

(32) $n(x)=\dfrac{\cancel{(x-2)}\cancel{(x^2+2x+4)}}{\cancel{(x-2)}\cancel{(x+1)}}\div\dfrac{\cancel{(x^2+2x+4)}}{\cancel{(x+1)}(2x-3)}$

$D=R-\{2,-1,\frac{3}{2}\}$

$n(x)=2x-3$

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(33) $2x+y=1 \rightarrow ①$ $\quad x+2y=5 \rightarrow ②$

$-4x-2y=-2 \rightarrow ③$

$-3x=3$

$\boxed{x=-1}$ in ①

$-2+y=1$, $\boxed{y=3}$, S.S. $=\{(-1,3)\}$

(34) $y-x=3$ $\quad x^2+y^2-xy=13 \rightarrow ②$

$y=x+3 \rightarrow ①$ From ① in ②

$x^2+\cancel{x^2}+6x+9-\cancel{x^2}-3x-13=0$

$x^2+3x-4=0$

$(x+4)(x-1)=0$

$x=-4$ or $x=1$

in ①

$y=-1$ or $y=4$

S.S. $=\{(-4,-1),(1,4)\}$

(35) ① $0.7+0.6-0.4=0.9$

② $0.7-0.4=0.3$

(36) $n(x)=\dfrac{x(x+1)}{(x-1)(x+1)}-\dfrac{(x-5)}{(x-5)(x-1)}$

$D=R-\{1,-1,5\}$

$n(x)=\dfrac{x-1}{x-1}=1$

(37) $a=1$, $b=-2$, $c=-6$

S.S. $=\{3.6, -1.6\}$

(38) $n_1(x)=\dfrac{x(x+2)}{(x+2)(x+2)}=\dfrac{x}{x+2}$, $D_1=R-\{-2\}$

$n_2(x)=\dfrac{2x}{2(x+2)}=\dfrac{x}{(x+2)}$, $D_2=R-\{-2\}$

$\therefore n_1=n_2$

(39) $D=R-\{-1,2\}$

$n^{-1}(3)=\dfrac{3+1}{3-2}=\dfrac{4}{1}=4$

(40) $n_1(x)=\dfrac{x^2-3x+9}{(x+3)(x-3x+9)}=\dfrac{1}{x+3}$

$D_1=R-\{-3\}$

$n_2(x)=\dfrac{2}{2(x+3)}=\dfrac{1}{x+3}$,

$D_2=R-\{-3\}$

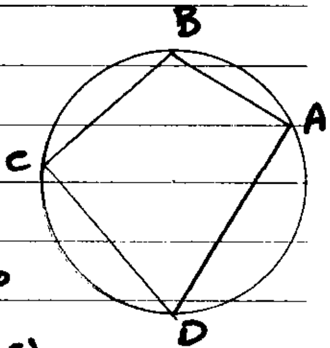
$\therefore n_1=n_2$

Geometry

Choose

① d	② a	③ d	④ a
⑤ b	⑥ a	⑦ b	⑧ d
⑨ b	⑩ c	⑪ d	⑫ a
⑬ a	⑭ d	⑮ c	⑯ d
⑰ c	⑱ a	⑲ c	⑳ d
(21) d	(22) d	(23) d	(24) b
(25) d	(26) c	(27) d	(28) b
(29) c	(30) d	(31) d	(32) c
(33) a	(34) b	(35) b	(36) a
(37) c	(38) b	(39) d	

①



$m(\angle B)+m(\angle D)$

$=\frac{1}{2}m(\widehat{ADC})$

$+\frac{1}{2}m(\widehat{ABC})$

$=\frac{1}{2}\times 360=180^\circ$

$\therefore m(\angle A)+m(\angle C)$

$=360-180=180^\circ$

② $\because \overleftrightarrow{BD}$ is a tangent

$\therefore m(\angle DBA)=m(\angle C) \rightarrow ①$

$\because \overleftrightarrow{BD} \parallel \overleftrightarrow{XY}$

$\therefore m(\angle DBA)=m(\angle BXY)$ Alt $\rightarrow ②$

From ①, ② $\therefore m(\angle BXY)=m(\angle C)$

$\therefore AXYC$ is a cyclic quad.

FIRST: ALGEBRA

Choose the correct answer:

(1) If the domain of $n(x)=\frac{x-1}{x-a}$ is R – {2}, then a = ………

a) -2 b) -1 c) 1 d) 2

(2) If $x-y=1$ and $(x-y)^2+y=1$, then x = ………

a) -2 b) -1 c) 1 d) 2

(3) If A is an event in a sample space of a random experiment and P(A) = 4 P(A\`), then P(A) = ………

a) 4 b) 1 c) $\frac{4}{5}$ d) $\frac{1}{4}$

(4) If the two equations: $3x-2y=5$ and $3x-2y=k$ have infinite number of solutions, then k = …………

a) 3 b) 2 c) -5 d) 5

(5) If $x=1$ is one of the set of zeros of $f(x)=x^2-3x+c$, then c=……

a) 0 b) 1 c) 2 d) 3

(6) Which of the following is in the simplest form?

a) $\frac{x+1}{x^2+1}$ b) $\frac{x+1}{x^2-1}$ c) $\frac{x}{x^2}$ d) $\frac{x}{x^2+x}$

(7) If $f(x)=x-3$, then $Z(f)=$ …….

a) R b) R – {3} c) {3} d) 3

(8) The two straight lines: $x=4$ and $y=3$ intersects at point ………

a) (4,3) b) (0,0) c) (3,4) d) (-3,-4)

(9) If X and Y are two mutually exclusive events, then P(X∩Y) = …

a) $\varnothing$ b) 0 c) { } d) 1

(10) The two 1^{st} degree equations in one variable which have infinite number of solutions are represented graphically by two straight lines are ……………

a) parallel
c) coincident
b) intersecting at one point
d) disjoint

(11) If $f(x)=\frac{7+x}{7-x}$, where $x \in R-\{7,-7\}$, then $f(-2)$ = ………

a) $\frac{-1}{f(-2)}$ b) $\frac{-1}{f(2)}$ c) $\frac{1}{f(2)}$ d) $\frac{1}{f(-2)}$

(12) If the domain of the function $n(x)=\frac{x-2}{x^2+k}$ is R, then k …… zero.

a) = b) < c) > d) ≤

(13) The intersection point of the two lines: $x+2=0$ and $y=x$ is ……

a) (2,2) b) (2,0) c) (-2,-2) d) (0,0)

(14) If $n(x)=\frac{x+1}{x-2}$, then the domain of its multiplicative inverse is …

a) R – {2} b) R – {-1,2} c) R – {-1} d) {-1,2}

(15) If the two equations: $x+2y=1$ and $x+ky=2$ have a one solution in R × R, then $k \neq$ ………

a) 2 b) 4 c) -2 d) -4

(16) If the curve of the quadratic function is passing through the points (2,0) and (-3,0), then the S.S. of $f(x)=0$ in R is ………

a) {-2,3} b) {3,2} c) {2,-3} d) {-3,0}

(17) The simplest form of $n(x)=\frac{3-x}{x-3}$ where $x \notin \{3\}$ is ………

a) 1 b) -1 c) 3 d) -3

(18) If A is an event in a sample space of a random experiment, then P(A`) = ………

a) 1 b) -1 c) 1-P(A) d) P(A)-1

(19) The S.S. of the equation $x^2+4=0$ in R is ....

a $\varnothing$ b {2} c {-2} d {2,-2}

(20) If $a^2-b^2=6$ and $a-b=\sqrt{3}$, then $(a+b)^2$ = ...

a $2\sqrt{3}$ b $3\sqrt{3}$ c $\sqrt{3}$ d 12

(21) If A and B are two mutually exclusive events, then P(A∩B) = ...

a 0 b $\varnothing$ c $\frac{1}{6}$ d 1

(22) If $f(x)=-3x$, then $Z(f)=$ ....

a $\varnothing$ b {0} c {3} d R-{3}

(23) The simplest form of $n(x)=\frac{x-7}{7-x}$ where $x\neq 7$ is ....

a 1 b -1 c 7 d -7

(24) If the domain of $n(x)=\frac{x+1}{x^2-kx+4}$ is R - {2}, then k = ...

a 2 b -2 c 4 d -4

(25) The S.S. of the two equations: $x-3=0$ and $y=4$ in R×R is ......

a {3,4} b {(3,4)} c {(4,3)} d (3,4)

(26) If A and B are two events in a sample space of a random experiment and A ⊂ B, then P(A ∪ B) = ...

a P(B) b P(A) c P(A∩B) d 0

(27) If $3^y\times 5^y=225$, then y = ...

a 2 b 15 c 0 d 20

(28) If $n(x)=\frac{x+2}{x-3}$, then the domain of its additive inverse is ....

a R-{3} b R-{-2} c R-{-2,3} d R

(29) If $f(x)=x^2+9$, then $Z(f)$ = ... in R

a R b $\varnothing$ c {3} d {3,-3}

(30) The curve $y = ax^2 + bx + c$ cuts y-axis at the point ....

ⓐ (0,b) ⓑ (b,0) ⓒ (c,0) ⓓ (0,c)

(31) If the two equations $x - 3y = 5$ and $2x + ky = 10$ have infinite number of solutions, then k = ...

ⓐ 10 ⓑ 6 ⓒ -6 ⓓ 3

(32) If $f(x) = x^3 - m$ and $Z(f) = \{3\}$, then m = ...

ⓐ 9 ⓑ 27 ⓒ 3 ⓓ $\sqrt[3]{3}$

(33) If A B = 3 and A B^2 = 9, then A^2 B = ...

ⓐ 3 ⓑ 9 ⓒ $\frac{1}{3}$ ⓓ $\frac{1}{9}$

(34) If the probability that a student is succeeded in an exam is $\frac{4}{5}$, then the probability of his failure is ....

ⓐ 10% ⓑ 20% ⓒ 0 ⓓ 1

(35) If the domain of $f(x) = \frac{1}{x} - \frac{5}{x+k}$ is R – {0,3}, then k = ...

ⓐ 3 ⓑ 6 ⓒ 5 ⓓ -3

(36) If P(A) = 0.6, then P(A`) = ...

ⓐ 0.4 ⓑ 0.6 ⓒ 0.5 ⓓ 1

(37) If x is a negative number, then the greatest one of the following is ....

ⓐ 7 x ⓑ 7 + x ⓒ 7 - x ⓓ $\frac{7}{x}$

(38) If the two equations $x + 2y = 1$ and $2x + ky = 2$ have one solution, then $k \neq$ ....

ⓐ 1 ⓑ 2 ⓒ 4 ⓓ -4

(39) If the domain of $n_1(x) = \frac{5}{x-8}$ equals the domain of $n_2(x) = \frac{x-3}{x+k}$, then k = ...

ⓐ 8 ⓑ -8 ⓒ 24 ⓓ 3

(40) Twice a 2-digit number, its units y and its tens x is ....

ⓐ $2y+10x$ ⓑ $2y+20x$ ⓒ $2x+10y$ ⓓ $2x+20y$

(41) A bag contains 20 cards numbered from 1 to 20, one card is chosen randomly, the probability of that the chosen card caries a number divisible by 2 and 3 together is ....

ⓐ $\frac{1}{2}$ ⓑ $\frac{6}{20}$ ⓒ $\frac{3}{20}$ ⓓ $\frac{13}{20}$

(42) If $f(x)=\frac{x^2-x-2}{x^2-4}$, then $Z(f)=$ .... in R.

ⓐ {2} ⓑ {-1} ⓒ {-1,2} ⓓ {-2,2}

(43) If $x^2+y^2=2xy$, then $x-y$ = ...

ⓐ $\sqrt{2xy}$ ⓑ $\sqrt{2}$ ⓒ 0 ⓓ ± 1

(44) If x = -3 is a root of the equation: $x^2+mx=9$, then m = ...

ⓐ 3 ⓑ -3 ⓒ 0 ⓓ -9

(45) The domain of the additive inverse of $n(x)=\frac{x}{x-3}$ is ....

ⓐ R ⓑ R – {0} ⓒ R – {3} ⓓ R – {0,3}

(46) Number of solutions of the two equations: $x-\frac{1}{2}y=4$ and $2x-y=2$ in R × R is .... solution(s).

ⓐ one ⓑ two ⓒ infinite ⓓ 0

(47) If A is an event in a sample space of a random experiment and P(A) = 4 P(A`), then P(A) = ...

ⓐ 0.8 ⓑ 0.6 ⓒ 0.4 ⓓ 0.2

(48) If the set of zeros of $f(x)=ax+6$ is {-2}, then a = ...

ⓐ 3 ⓑ 2 ⓒ -2 ⓓ -3

(49) If $y=1-x$ and $(x+y)^2+y=5$, then y = ...

ⓐ 5 ⓑ 4 ⓒ 3 ⓓ -4

(50) The two straight lines $3x+5y=0$ and $5x-3y=0$ intersects at ...

a origin point b 1^{st} quad. c 2^{nd} quad. d 4^{th} quad.

(51) The additive inverse of the fraction $\frac{x+7}{x-5}$ where $x \neq 5$ is ....

a $\frac{7-x}{x+5}$ b $\frac{x+7}{5-x}$ c $\frac{-(x+7)}{5-x}$ d $\frac{x-7}{5-x}$

(52) If A is an event in a sample space of a random experiment and 2 P(A) = 3 P(A\`), then P(A) = ...

a 0.8 b 0.6 c 0.4 d 0.2

(53) In the equation: $ax^2+bx+c=0$, if $b^2-4ac<0$, then the number of real roots of this equation is ....

a 1 b 2 c 0 d Infinite

(54) If $n(x)=\frac{x-1}{x+2}$, then $n^{-1}(4)$ = ...

a -1 b 2 c 3 d undefined

(55) If $x^2-y^2=6$ and $x-y=\sqrt{3}$, then $(x+y)^2$ = ...

a $2\sqrt{3}$ b $3\sqrt{3}$ c $\sqrt{3}$ d 12

(56) If the two equations: $x+4y=m$ and $3x+ky=21$ have infinite number of solutions in R × R, then k + m = ...

a 19 b 20 c 21 d 22

(57) The common domain of the fractions: $\frac{2}{x^2-1}$ and $\frac{5x}{x^2-x}$ is ....

a R-{1} b R-{0,1} c R-{±1} d R-{0,±1}

(58) If a coin flipped once, the probability of landing a tail = ...

a 100% b 50% c 25% d 0

(59) If the S.S. of the equation $4x^2+4x+c=0$ in R is $\left\{\frac{-1}{2}\right\}$, then the value of c is ....

a 2 b 1 c -1 d -8

(60) If $n(x)=\frac{x^2-x}{x^2-1}$ and $n^{-1}(k)=3$, then k = ...

ⓐ $\frac{-1}{2}$ ⓑ $\frac{1}{2}$ ⓒ $\frac{3}{4}$ ⓓ $1\frac{1}{3}$

(61) If the domain of $f(x)=\frac{x+b}{x+a}$ is R - {-2} and $f(0)$ = 3, then $a + b$ = ...

ⓐ 2 ⓑ 6 ⓒ 8 ⓓ 10

(62) The solution set of the two equations: $x=2$ and $xy=6$ is ....

ⓐ {(2,3)} ⓑ {2,3} ⓒ {(3,2)} ⓓ {3}

Essay problems:

(1)	Without using the calculator, find the S.S. of the equation $x^2-8x+3=0$ in R. where $\sqrt{13}\cong 3.6$
(2)	Without using the calculator, find the S.S. of the equation $x+\frac{1}{x}=5$ in R. where $\sqrt{17}\cong 4.12$
(3)	Without using the calculator, find the S.S. of the equation $x(x-3)=-1$ in R. to the nearest one decimal place.
(4)	Without using the calculator, find the S.S. of the equation $\frac{5}{x^2}-\frac{2}{x}=1$ in R. where $\sqrt{6}\cong 2.45$
(5)	Without using the calculator, find the S.S. of the equation $\frac{x^2}{9}+\frac{4}{3}x=-2$ in R. to the nearest one decimal place.

(6) Find each of $n_1(x)=\frac{2x}{2x+4}$ and $n_2(x)=\frac{x^2+2x}{x^2+4x+4}$ in the simplest form, showing the domain of each one, state that if n_1 = n_2 or not? Give reason.

(7)	If $n_1(x)=\frac{x^2+5x}{x^2+10x+25}$ and $n_2(x)=\frac{2x}{2x+10}$, prove that $n_1 = n_2$
(8)	If $n_1(x)=\frac{x^2-4}{x^2+x-6}$ and $n_2(x)=\frac{x^2-x-6}{x^2-9}$, prove that $n_1(x)=n_2(x)$ in the common domain, and find this domain.
(9)	If $n_1(x)=\frac{x-1}{x}$ and $n_2(x)=\frac{x^2-1}{x^2+x}$, show that if $n_1 = n_2$ or not? Give reason.

(10)	Find algebraically the S.S. in R × R of the two equations: $x-y=0$ and $x=\frac{4}{y}$
(11)	Find algebraically the S.S. in R × R of the two equations: $x=2y+3$ and $y^2-x=0$
(12)	Find algebraically the S.S. in R × R of the two equations: $x-y=0$ and $xy=4$
(13)	Find algebraically in the S.S. R × R of the two equations: $x+y=3$ and $x^2+xy=6$
(14)	Find algebraically in the S.S. R × R of the two equations: $x=y+4$ and $3x+4y=5$
(15)	Find algebraically in the S.S. R × R of the two equations: $3x-y=5$ and $x+2y=4$
(16)	Find graphically the S.S in R × R of the two equations: $y=2x-5$ and $x=-3y-1$.
(17)	Find graphically the S.S. of the equation $x^2-2x=3$ in R on the interval [-2,4].

(18)	A rectangle which its length is more than its width by 5 cm. And its perimeter is 18 cm. Find the area of rectangle.

(19) If the perimeter of rectangle is 14 cm, and its area is 12 cm^2. Find its two dimensions.

(20) A point lies on the straight line $5x-2y=1$ where its y-coordinate is twice the square of its x-coordinate. Find the coordinates of this point.

(21) The area of a rectangle is 77 cm^2. If its length decreases by 2 cm and the width increases by 2 cm it will be a square. Find the area of the square.

(22) If the length of a diagonal of a rectangle is 5 cm and its perimeter is 14 cm. Find its area.

(23) Simplify showing the domain: $n(x)=\frac{x^2-3x+2}{x^2+x-6}\times\frac{x^2+2x}{x^2+x-2}$, and then find $n(1)$ if possible.

(24) Simplify showing the domain: $n(x)=\frac{x^2-9}{x^2-x-6}-\frac{x^2-4x}{x^2-2x-8}$

(25) Simplify showing the domain: $n(x)=\frac{x^2+x+1}{x^3-1}\div\frac{x^2-x}{x^2-2x+1}$

(26) Simplify showing the domain: $n(x)=\frac{3x-6}{x^2-4}-\frac{9}{2-x-x^2}$

(27) Simplify showing the domain: $n(x)=\frac{x^2+x}{x^2-1}-\frac{5-x}{x^2-6x+5}$

(28) If A and B are two events of a sample space of a random experiment and P(A) = $\frac{1}{2}$, P(B) = $\frac{2}{5}$ and P(A $\cap$ B) = $\frac{1}{10}$. Find:

(a) P(A$\cup$B) (b) P(A-B)

(29) If A and B are two events of a sample space of a random experiment and P(A) = 0.8, P(B) = 0.7 and P(A$\cap$B) = 0.6. Find:

(a) The probability of non occurrence of the event A.

(b) The probability of occurrence one of the two events at least.

(30)	If A and B are two events of a sample space of a random experiment and $P(A) = \frac{1}{4}$ and $P(B) = \frac{2}{3}$. Find $P(A \cup B)$ if: (a) $P(A \cap B) = \frac{1}{6}$ (b) $A \subset B$
(31)	If A and B are two events of a sample space of a random experiment and $P(A) = 0.3$, $P(B) = m$ and $P(A \cup B) = 0.7$. Find the value of m if: (a) $P(A \cap B) = 0.2$. (b) A and B are two mutually exclusive events.

ACCUMULATIVE SKILS

Choose the correct answer:

1 IF $3x = 45$, then $\frac{1}{5}x$ = ...

a 3 b 5 c 15 d 45

2 If $5^{x} = 1$, then 5^{x-1} = ...

a -1 b $\frac{1}{5}$ c 1 d 5

3 If $\sqrt{25-16} = 5-k$, then k = ...

a 4 b -4 c 2 d 3

4 If $ab = 3$ and $ab^{2} = 12$, then b = ...

a -4 b -2 c 2 d 4

5 Half of the number 2^{6} is ......

a 2^{3} b 2^{5} c 2^{6} d 2^{11}

6 If $ab^{20} = 40$, $ab^{19} = 20$, $a \neq 0$, $b \neq 0$, then b = ...

a 1 b 2 c 3 d 4

7 If $2^{x-3} = 1$, then x = ...

a 2 b -2 c 3 d -3

8 The solution set of the equation $x^{2} + 9 = 0$ in R is ......

a {3} b {-3} c {±3} d $\varnothing$

9 If $2^{5} \times 3^{5} = 6^{x}$, then x = ...

a 5 b 6 c 10 d 25

10 $3 \times 4 - 4 \div 2$ = ...

a 6 b 8 c 10 d 12

11 $\sqrt{\sqrt{81}}$ = ...

a 9 b -3 c -9 d 3

12 If $3^x = 5$ and $5^y = 3$, then $x\,y =$ ......

a) 1 b) -1 c) 5 d) 3

13 $\frac{1}{3} + \frac{1}{6} =$ ......

a) $\frac{2}{9}$ b) $\frac{1}{9}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$

14 A rectangle of perimeter 30 cm, its width is 5 cm, then its length is … cm

a) 5 b) 10 c) 15 d) 20

15 The probability of the impossible event = ...

a) 0 b) 0.5 c) -1 d) 1

16 If $x + y = 2$, $x^2 - y^2 = 10$, then $y - x =$ ......

a) 5 b) -5 c) ± 5 d) 10

17 If $a(c+d) - b(c+d) = 12$ and $c + d = 4$, then $a - b =$ ......

a) 3 b) -3 c) 48 d) 8

18 The solution set of the equation: $x^2 = x$ in R is ......

a) $\varnothing$ b) {0} c) {1} d) {0,1}

19 If $x^3 + k = (x-10)(x^2 + 10x + 100)$, then $k =$ ......

a) 1000 b) -1000 c) 99 d) 999

20 If $5^x = 3$ and $5^y = 7$, then $5^{x-y} =$ ......

a) $\frac{3}{7}$ b) $\frac{7}{3}$ c) 21 d) 4

21 If $\frac{1}{3}x = 6$, then $\frac{1}{2}x =$ ......

a) 6 b) 9 c) 3 d) 18

22 $|-4| + |4| =$ ......

a) 0 b) -8 c) 8 d) 16

23 If $\sqrt{16 + 9} = 4 + k$, then $k =$ ......

a) 1 b) 0 c) 0.5 d) -1

24 The probability of the certain event = ...

a 1 b 0 c 0.5 d -1

25 $R^+ \cap R^-$ = ...

a R b Z c $\varnothing$ d R-{0}

26 The arithmetic mean of the values: 2, 3, 4, 7 and 9 is ......

a 4 b 5 c 6 d 8

27 If $2^7 \times 3^7 = 6^k$, then k = ...

a 14 b 5 c 7 d 0

28 If $\frac{1}{5}x = \frac{1}{10}$, then $2x$ = ...

a 0.5 b 20 c 2 d 1

29 If x is the additive identity and y is the multiplicative identity, then $7^x + 2^y$ = ...

a 2 b 3 c 7 d 9

30 The S. S. of the inequality $x < 2$ in R is ......

a [2,∞[b]2,∞[c] -∞,2[d [-∞,2[

31 If 5 times a number is 45, then the ninth of this number = ...

a 1 b 5 c 9 d 81

32 If $x^2 + kx + 36$ is a perfect square, then k = ...

a ± 6 b ± 8 c ± 18 d ± 12

33 If $x^3 = 64$, then $\sqrt{x}$ = ...

a 2 b ± 2 c -2 d 4

34 If $5^{x-3} = 1$, then x = ...

a 1 b 5 c 0 d 3

35 If $|x| = 7$, then x = ...

a 7 b -7 c ± 7 d 14

36 Half of the number 4^6 is ……

ⓐ 2^3 ⓑ 2^6 ⓒ 4^3 ⓓ 2^{11}

37 In the experiment of throwing a fair die once, the probability of getting an odd prime number is ……

ⓐ $\frac{1}{2}$ ⓑ $\frac{1}{3}$ ⓒ $\frac{1}{6}$ ⓓ $\frac{1}{4}$

38 If $3a = \sqrt{4b}$, then $\frac{a}{b}$ = ……

ⓐ $\frac{2}{3}$ ⓑ $\frac{3}{2}$ ⓒ $\frac{3}{4}$ ⓓ $\frac{4}{3}$

39 The middle proportional between 9 and 16 is ……

ⓐ ± 9 ⓑ ± 12 ⓒ ± 16 ⓓ ± 25

40 If $x^3 y^{-3} = 27$, then $\frac{y}{x}$ = ……

ⓐ 27 ⓑ $\frac{1}{27}$ ⓒ $\frac{1}{3}$ ⓓ 3

REVISION 1

1) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x - y = 4$, $x + y = 4$

2) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x - y = 4$, $3x + 2y = 7$

3) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x - 3y = 6$, $2x + y = 5$

4) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x + 2y = 4$, $2x - y = 3$

5) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$3x + 4y = 24$, $x - 2y = -2$

6)Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$2x - y = 3$, $x + 3y = 5$

7) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$3x + 4y = 11$, $2x + y - 4 = 0$

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8) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$2y = 3x - 1$, $x - y + 1 = 0$

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9) Find graphically and algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$y = x + 1$, $y = 2x - 1$

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10) **Find graphically and algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :**

$2x + y = 1$, $x + 2y = 5$

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11) **Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :**

1) $x - y = 0$, $xy = 9$

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12) **Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :**

$x - y = 2$, $x^2 + y^2 = 20$

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13) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x + y = 7$, $x^2 + y^2 = 25$

14) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x = y + 2$, $x^2 + xy = 0$

15) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x + y = 3$, $xy + y^2 = 6$

16) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

y - x = 2 , $x^2 + x$y - 4 = 0

17) Find algebraically the S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations :

y + 2x = 7 , $2x^2 + x$ + 3 y = 19

18) Find the solution set of the equation $3x^2$ - 6 x +1 = 0 rounding the results to two decimal places**.**

19) Find the solution set of the equation x^2 - 2 x - 6 = 0 rounding the results to two decimal places.

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20) Find the solution set of the equation x^2 + 3 x - 3 = 0 using general formula , rounding the results to two decimal places.

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21) Find the solution set of the equation x^2 - 4 x + 1 = 0 using general formula rounding the results to two decimal places.

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22) Find the solution set of the equation $x^2 + x = 3$ using general formula rounding the results to one decimal places.

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13) Find the solution set of the equation $x^2 - x = 4$ using general formula given that $\sqrt{17} \simeq 4.12$

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14) Graph the quadratic Function $f(x) = x^2 - 4x + 3$, $x \in [-1,5]$

Then from the graph deduce :

1) The coordinates of the vertex of the curve

2) The minimum value of the function

3) the S.S in R of the equation $x^2 - 4x + 3 = 0$

25) Graph the quadratic Function $f(x) = x^2 - 1$, $x \in [-2, 2]$

Then from the graph deduce :

1) The coordinates of the vertex of the curve

2) The minimum or the maximum value of the function

3) The two roots of $f(x) = 0$

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26) Graph the quadratic Function $f(x) = 4 - x^2$, $x \in [-3, 3]$

Then from the graph deduce :

1) The two roots of $f(x) = 0$

2) Equation of axis of symmetry

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27) Graph the quadratic Function $f(x) = x^2 + 3$, $x \in [-3, 3]$

Then from the graph deduce :

1) The two roots of $f(x) = 0$

2) Equation of axis of symmetry

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28) Graph the quadratic Function $f(x) = x^2 - 2x - 3$, $x \in [-2, 4]$

Then from the graph deduce :

1) The coordinates of the vertex of the curve

2) The minimum value of the function

3) the S.S in R of the equation $x^2 - 2x - 3 = 0$

29) Graph the quadratic Function $f(x) = (x-2)^2, x \in [-1, 5]$

Then from the graph deduce : The S.S of the equation $f(x) = 0$

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30) The difference between two numbers is 5 and the product of them is 36 , Find the two numbers

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31) Two acute angles in right angled triangle , the difference between their measure is 40° , find the two angles

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32) A rectangle with length more than width by 2cm , if the perimeter of the rectangle is 32 cm , find the area of the rectangle

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33) A number formed from two digits , their sum is 11 , if twice the unit digit exceed three times the tens by 2 , Find the number

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34) Choose the correct answer :

1) The solution set of the two equations x + y = 0 , x - 2 = 0 is :

a) {(0, 2)} **b)** {(2, 2)} **c)** {(-2, 2)} **d)** {(2, -2)}

2) The two straight lines : 3x + 5 y = 0 , 5x - 3 y = 0 are intersected in

a) The origin **b)** First quadrant **c)** Second quadrant **d)** Fourth quadrant

3) The solution set of the two equations x - 2 y = 1 , 3x + y = 10 is :

a) {(5, 2)} **b)** {(2, 4)} **c)** {(1, 3)} **d)** {(3, 1)}

4) The solution set of the two equations x - y = 0 and x y = 9 is :

a) {(0, 0)} **b)** {(-3, -3)} **c)** {(3, 3)} **d)** {(-3, -3), (3, 3)}

5) One of the solutions for the two equation: x - y = 2, $x^2 + y^2$ = 20 is :

a) (-4, 2) **b)** (2, -4) **c)** (3, 1) **d)** (4, 2)

6) If the sum of two positive numbers is 7 and their product is 12 then the two numbers are :

a) 5, 2 **b)** 2, 6 **c)** 3, 4 **d)** 1, 6

7) Two numbers their sum = 13 and their difference is 5 , then the two numbers are

a) 7, 6 **b)** 8, 5 **c)** 10, 3 **d)** 9, 4

8) Two numbers their sum = 9 and their product is 8 , then the two numbers are

a) 2, 7 **b)** 3, 6 **c)** 4, 5 **d)** 1, 8

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9) The age of ahmed is x years , then his age after 10 years is ……….

a) x + 6 **b)** x - 6 **c)** x + 10 **d)** x -10

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10) The age of ahmed is x years , then his age 6 years ago is ……….

a) x + 6 **b)** x - 6 **c)** x + 10 **d)** x -10

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11) The number of the solutions of the two equations $x - 2y = 2$ and $3x - 6y = 6$ is ……………………

a) 1 **b)** 2 **c)** 3 **d)** an infinite

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12) If (2 , 1) is a solution of the equation $2x + ay = 6$, then a = …………

a) 1 **b)** 2 **c)** 3 **d)** 6

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13) The ordered pair that satisfy the two equations : $xy = 2$, $x - y = 1$ is….

a) (1, 2) **b)** (2, 1) **c)** (1, 1) **d)** (3, 1)

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14) If x =3 is a root of the equation : $x^2 + mx = 3$, then m = …………….

a) -1 **b)** -2 **c)** 2 **d)** 1

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15) The two straight lines representing the two equations $2x - y = 4$, $2x - y = 3$ are….

a) Parallel **b)** Coincident **c)** intersecting **d)** perpendicular

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16) The two straight lines representing the two equations $6x - 9y = 15$, $2x - 3y = 5$ are….

a) Parallel **b)** Coincident **c)** intersecting **d)** perpendicular

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17) If the two equations : $x + 4y = 7$, $3x + ky = 21$ have infinite solutions , then k=…………

a) 4 **b)** 7 **c)** 12 **d)** 21

REVISION 2

1) Find n(x) in the simplest form showing its domain where :

$n(x) = \frac{5}{x-3} + \frac{4}{x-3}$

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2) Find n(x) in the simplest form showing its domain where :

$n(x) = \frac{5}{x-2} + \frac{4}{x+3}$

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3) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{x}{x^2 + 2x} + \frac{x - 2}{x^2 - 4}$$

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4) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{3x-4}{x^2-5x+6} + \frac{2x+6}{x^2+x-6}$$

5) Find n(x) in the simplest form showing its domain where :

$n(x) = \frac{x^2-4}{x^2+3x+2} - \frac{x^2-2x}{x^2-x-2}$ **, then find n(0)**

6) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{3x}{x^2-2x} - \frac{12}{x^2-4}$$

7) Find n(x) in the simplest form showing the domain of n

where : $n(x) = \frac{12}{12x^2-3} + \frac{2}{2x-4x^2}$ then find f(0) , f(-1) if possible

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8) $n_1(x) = \frac{x}{x^2+2x}$, $n_2(x)\frac{x+2}{x^2-4}$

Find $n(x) = n_1(x) + n_2(x)$ show the domain of n.

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9) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{x^2-2x+4}{x^3+8} + \frac{x^2-x-2}{x^2-4}$$

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10) **Find n(x) in the simplest form showing its domain where :**

$n(x) = \frac{x}{x^2+2x} - \frac{x-2}{4-x^2}$ **Then find** $n(-2)$ **if possible**

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11) **Find n(x) in the simplest form showing its domain where :**

$n(x) = \frac{x^2+x+1}{x} \times \frac{x^2-x}{x^3-1}$

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12) **Find n(x) in the simplest form showing its domain where :**

$\frac{x^3-1}{x^2-x} \times \frac{x+3}{x^2+x+1}$

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13) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{x^2-12x+36}{x^2-6x} \times \frac{4x+24}{36-x^2}$$

14) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{x^2-49}{x^3-8} \div \frac{x+7}{x-2}$$

15) Find n(x) in the simplest form showing its domain where :

$$n(x) = \frac{x^2+2x-3}{x+3} \div \frac{x^2-1}{x+1}$$

16) **Find n(x) in the simplest form showing its domain where :**

$$\frac{x^2-4}{x^2+3x+2} \div \frac{x^2-2x}{x^2-x-2}$$

17) **Find n(x) in the simplest form showing its domain where :**

$$n(x) = \frac{x^2-3x+2}{x^2-49} \div \frac{x-2}{x+7}$$

18) **Find n(x) in the simplest form showing its domain where :**

$$n(x) = \frac{x^2+x+1}{x^2-9} \div \frac{x^3-1}{x^2-4x+3}$$

19) Find n(x) in the simplest form showing its domain where :

$$\frac{x^3-8}{x^2-x-6} \div \frac{x^2+2x+4}{x-3}$$

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19) Find n(x) in the simplest form showing its domain where :

$$\frac{x^3-8}{x^2-x-6} \div \frac{x^2+2x+4}{x-3}$$

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20) If $n(x) = \frac{x^3+3x^2+2x}{x^2+2x}$ **find** $\boldsymbol{n^{-1}(x)}$ in the simplest form showing the domain of n^{-1} , then **find** $\boldsymbol{n^{-1}(-2)}$ if it is possible

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21) If A and B are two events in the sample space of a random experiment where $P(A) = \frac{1}{2}$, $P(B) = \frac{2}{3}$, $P(A \cap B) = \frac{1}{3}$ then

a) Find $P(A \cup B)$
b) Find $P(A - B)$
c) Find $P(A \cup B)`$
d) Find $P(A \cap B)`$
e) Find $P(A`)$
e) Find $P(B`)$

22) If A and B are two events in the sample space of a random experiment where $P(A) = 0.7$, $P(B) = 0.4$, $P(A \cap B) = 0.2$ then

a) Find $P(A \cup B)$
b) Find $P(A - B)$
c) Find $P(A \cup B)`$
d) Find $P(A \cap B)`$
e) Find $P(A`)$
e) Find $P(B`)$

23) If A and B are two events of a random experiment where $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(A \cap B) = \frac{1}{8}$ then **Find $P(A \cup B)$**

24) If A and B are two events in the sample space of a random experiment where P (A) = $\frac{3}{8}$, P (B) = $\frac{1}{2}$, P (A ∪ B) = $\frac{5}{8}$ then

a) Find P (A ∪ B) **b) Find P (A − B)**

c) Find P (A ∪ B)`** **d) Find P (A ∩ B)`

e) Find P (A`)** **e) Find P (B`)

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25) If A and B are two mutually exclusive events of a random experiment where P (A) = $\frac{1}{2}$, P (B) = $\frac{1}{3}$, then :

a) Find P (A ∪ B)

b) Find the probability of non occurrence of A

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26) If A and B are two mutually exclusive events of a random experiment where P (A) = $\frac{1}{8}$, P (A ∪ B) = $\frac{3}{8}$, then :

a) Find P (B) **a) Find P (A`)**

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26) Choose the correct answer

1) $P(A) = 0 \cdot 3$, then probability of P(A\`)=...............

a) 1 b) 0 c) $\frac{1}{2}$ d) 0.7

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2) $P(A) = \frac{5}{7}$, then probability of P(A\`)=...............

a) 1 b) 0 c) $\frac{2}{7}$ d) $\frac{2}{10}$

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3) $P(A) = 30\%$, then probability of P(A\`)=...............

a) 1 b) 0 c) 70% d) 30%

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4) If a regular dice is rolled once , then the probability of getting an even number = ...

a) ∅ b) 0 c) 0.5 d) 0.3

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5) If a regular dice is rolled once , then the probability of getting an even number = ...

a) ∅ b) 0 c) $\frac{1}{2}$ d) $\frac{2}{3}$

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6) If A and B are two mutually exclusive events then P (A ∩ B) =.........................

a) ∅ b) 0 c) 0.5 d) 0.3

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7) If A ⊂ B , then P (A ∪ B) =.........................

a) ∅ b) 0 c) P (A) d) P (B)

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8) If A ⊂ B , then P (A ∩ B) =.........................

a) ∅ b) 0 c) P (A) d) P (B)

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9) If a regular coin is tossed once, then the probability of getting head or tail =……………………

a) 0 % **b)** 25 % **c)** 50 % **d)** 100%

10) If a die is rolled once, then the probability of getting an odd number and even number together =……………………

a) ∅ **b)** 0 **c)** 1 **d)** 0.5

11) If a die is rolled once, then the probability of getting an odd number or even number equals =……………………

a) ∅ **b)** 0 **c)** 1 **d)** 0.5

12) If A and B are two events from the sample space of random experiment and if P (B)=0.7 and P (A)=0.2 , $A \subset B$
then P (A ∩ B) =……………………

a) 0 **b)** 0.2 **c)** 0.7 **d)** 1

13) If A and B are two events from the sample space of random experiment and if P (B)=0.7 and P (A)=0.2 , $A \subset B$
then P (A ∪B) =……………………

a) 0 **b)** 0.2 **c)** 0.7 **d)** 1

14) The set of zeroes of f : where f(x) = -3x is:

a) {0} **b)** {-3} **c)** {-3,0} **d)** ℝ

15) The set of zeroes of the function f where $f(x) = 2x^2$, is ………………

a) $\{0\}$ **b)** $\mathbb{R} - \{0\}$ **c)** $\mathbb{R} - \{2\}$ **d)** $\mathbb{R} - \{-1\}$

16) The set of zeroes of the function f where $f(x) = x + 1$, is ………………

a) $\{0\}$ **b)** $\mathbb{R} - \{0\}$ **c)** $\mathbb{R} - \{-1\}$ **d)** $\{-1\}$

---

17) The set of zeroes of f : where $f(x) = x(x^2 - 2x + 1)$ is :

a) {0 , 1} **b)** {0 , -1} **c)** {-1 , 0} **d)** {1}

---

18) If $z(f) = \{2\}$, $f(x) = x^3 - m$, then m =……

a) $\sqrt[3]{2}$ **b)** 2 **c)** 4 **d)** 8

---

19) If $z(f) = \{5\}$, $f(x) = x^3 - 3x^2 + a$, then a =………………

a) -5 **b)** 5 **c)** 50 **d)** -50

---

20) If $z(f) = \{1, -2\}$, $f(x) = x^2 + x + a$, then a =……

a) -2 **b)** -1 **c)** 1 **d)** 28

---

22) If $n(x) = \frac{x}{x+5}$ then the domain of the function is …..

a) $\{0\}$ **b)** $\mathbb{R} - \{-5\}$ **c)** $\mathbb{R} - \{7\}$ **d)** $\mathbb{R} - \{-5,7\}$

---

23) If $\mathrm{n}(x) = \frac{3}{x^2 + 2x - 15}$ then the domain of the function is …..

a) $\{0\}$ **b)** $\mathbb{R} - \{-5,3\}$ **c)** $\mathbb{R} - \{7\}$ **d)** $\mathbb{R} - \{5, -3\}$

---

24) If $n_1(x) = \frac{x}{x+5}$, $n_2(x) = \frac{x-1}{x-7}$, then the common domain of the two functions is ………………

a) $\{0\}$ **b)** $\mathbb{R} - \{-5\}$ **c)** $\mathbb{R} - \{7\}$ **d)** $\mathbb{R} - \{-5,7\}$

25) If $n_1(x) = \frac{x+2}{x-1}$, $n_2(x) = \frac{x-1}{x+3}$, then the common domain of the two functions is ………………

a) $\mathbb{R}$ **b)** $\mathbb{R} - \{-1\}$ **c)** $\mathbb{R} - \{1, -3\}$ **d)** $\mathbb{R} - \{-1,3\}$

---

26) If $n_1(x) = \frac{x+2}{x-1}$, $n_2(x) = \frac{x-1}{x^2+4}$, then the common domain of the two functions is ………………

a) $\mathbb{R}$ **b)** $\mathbb{R} - \{-1\}$ **c)** $\mathbb{R} - \{1\}$ **d)** $\mathbb{R} - \{-1, -2\}$

---

27) If $n(x) = \frac{3}{x+l}$ and the domain of the function is $\mathbb{R} - \{-2\}$
Then l = ……………

a) -2 **b)** 3 **c)** 2 **d)** -3

---

28) If $n(x) = \frac{x-3}{x+3}$ then the domain of $n^{-1}(x)$=……….

a) $\mathbb{R}$ **b)** $\mathbb{R} - \{-3\}$ **c)** $\mathbb{R} - \{3\}$ **d)** $\mathbb{R} - \{3, -3\}$

---

29) The simplest form of the function f , where $f(x) = \frac{2x^2+x}{x}$ is ……….

a) $3x$ **b)** $2x^2 + 1$ **c)** $x^2 + 1$ **d)** $x + 1$

Best Wishes

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1 Choose the correct answer from those given

1 The S.S of the two equations : $x + y = 0$, $y - 5 = 0$ is ....

ⓐ $\{5, -5\}$ ⓑ $\{(5, -5)\}$ ⓒ $\{(-5, 5)\}$ ⓓ $(-5, 5)$

2 The S.S of the two equations : $x - 2y = 1$, $3x + y = 10$ is ....

ⓐ $\{(5, 2)\}$ ⓑ $\{(2, 4)\}$ ⓒ $\{(1, 3)\}$ ⓓ $\{(3, 1)\}$

3 The two equations : $3x + 5y = 0$, $5x - 3y = 0$ are intersected in ....

ⓐ First quadrant ⓑ Second quadrant ⓒ The origin point ⓓ Fourth quadrant

4 The S.S of the two equations : $x = 3$, $y = 4$ is ....

ⓐ $\{(3, 4)\}$ ⓑ $\{(4, 3)\}$ ⓒ $\mathbb{R}$ ⓓ ϕ

5 The number of solutions of the two equations : $x + y = 2$, $y + x = 3$ together is ....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ 3

6 The two straight lines representing the two equations : $2x - y = 4$, $2x - 3 = y$ are ....

ⓐ Parallel ⓑ Coincident ⓒ Perpendicular ⓓ intersecting

7 The two straight lines representing the two equations : $6x - 9y = 15$, $2x - 3y = 5$ are ....

ⓐ Parallel ⓑ Coincident ⓒ Perpendicular ⓓ intersecting

8 If The two straight lines representing the two equations : $x + 3y = 4$, $x + ay = 7$ are parallel

Then : $a =$ ....

ⓐ 3 ⓑ 2 ⓒ -3 ⓓ -2

9 If there is only one solution for the two equations : $x + 2y = 1$, $2x + ky = 2$.

Then : k cannot equal ....

ⓐ 2 ⓑ 3 ⓒ 4 ⓓ -4

10 If the point of intersection of the two equations : $x - 3 = 0$, $y + 2k = 5$ lies on the fourth quadrant

Then : k may be equal ....

ⓐ -1 ⓑ -2 ⓒ 1 ⓓ 3

11 The number of solutions of the equation : $x + y = 5$ in $\mathbb{R} \times \mathbb{R}$ is ....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ Infinite numbers

12 If the point $(9 , 2)$ belong to the set of solutions of the equation : $x - k\,y = 3$, then : $k =$ ....

ⓐ 1 ⓑ 2 ⓒ 3 ⓓ 6

13 Two numbers their sum = 13 and their difference is 5 , then the two number are ....

ⓐ 7 and 6 ⓑ 8 and 5 ⓒ 9 and 4 ⓓ 10 and 3

14 Three years ago , ahmed's age was x years , then his age after 5 years is .... years

ⓐ $x + 3$ ⓑ $x + 5$ ⓒ $x + 8$ ⓓ $x + 2$

15 If the age of ahmed now is x years , then his age 4 years ago is .... years.

ⓐ $x + 4$ ⓑ $x - 4$ ⓒ x ⓓ $4\,x$

16 A two-digit-number , ones digit is x and tens digit is y , then the number is ....

ⓐ $x + 10\,y$ ⓑ $y + 10\,x$ ⓒ $x\,y$ ⓓ $x + y$

17 The solution set of the equation : $x^2 + 4 = 0$ in $\mathbb{R}$ is ....

ⓐ $\{2\}$ ⓑ $\{2 , -2\}$ ⓒ $\{-2\}$ ⓓ ϕ

18 If the curve of the quadratic function f does not intersect X-axis at any points.

then the number of solution of the equation : $f(x) = 0$ in $\mathbb{R}$ is ....

ⓐ A unique solution ⓑ An infinite solutions
ⓒ zero ⓓ One solution

19 If the curve of the quadratic function f passes through the points $(2 , 0)$, $(0 , -3)$, $(3 , 0)$.

then the solution set of the equation : $f(x) = 0$ in $\mathbb{R}$ is ....

ⓐ $\{2 , -3\}$ ⓑ $\{2 , 3\}$ ⓒ $\{2 , 3 , -3\}$ ⓓ $\{-3\}$

20 If the curve of the quadratic function f has a minimum value at $y = 1$.

then the solution set of the equation : $f(x) = 0$ in $\mathbb{R}$ is ....

ⓐ $\{1\}$ ⓑ $\{-1\}$ ⓒ $\mathbb{R}$ ⓓ ϕ

21 The curve of the quadratic function f where $f(x) = x^2 - 6\,x + 9$ ....

ⓐ Intersect X-axis in two points. ⓑ Intersect X-axis in one point.
ⓒ Does not intersect X-axis. ⓓ Passes through the origin point.

22 If : $x = 3$ is one of the solutions of the function $f : f(x) = x^2 - a\,x + 3$, Then : $a =$ ....

ⓐ 1 ⓑ 2 ⓒ 3 ⓓ 4

23 The number of solutions of the equation : $x^2 - 3\,x - 4 = 0$ in $\mathbb{N}$ is ....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ 3

24 in the equation : $x^2 + a x + 1 = 0$, if : $a \in]-2, 2[$, then the number of solution of the equation in $\mathbb{R}$ is ....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ 3

25 Two numbers , their sum = 9 and their multiplying is 20 , then the two number are ....

ⓐ 10 and 2 ⓑ 4 and 5 ⓒ – 4 and – 5 ⓓ 8 and 1

26 If : $x + y = 3$ and $x^2 - y^2 = 6$, then : $x - y =$ ....

ⓐ 18 ⓑ 9 ⓒ 3 ⓓ 2

27 If : $x^2 + y^2 = 9$ and $(x + y)^2 = 17$, then : $x - y =$ ....

ⓐ 16 ⓑ 8 ⓒ 4 ⓓ 2

28 The S.S of the two equations : $x - y = 0$, $x y = 9$ in $\mathbb{R} \times \mathbb{R}$ is ....

ⓐ $\{(0, 0)\}$ ⓑ $\{(-3, -3)\}$ ⓒ $\{(3, 3)\}$ ⓓ $\{(3, 3), (-3, -3)\}$

29 one of the solutions of the two equations : $x - y = 2$, $x^2 + y^2 = 20$ in $\mathbb{R} \times \mathbb{R}$ is ....

ⓐ $(-4, 2)$ ⓑ $(2, -4)$ ⓒ $(3, 1)$ ⓓ $(4, 2)$

30 The set of zeroes of the function : $f : f(x) = -3x$ is ....

ⓐ $\{0\}$ ⓑ $\{-3, 0\}$ ⓒ $\{-3\}$ ⓓ $\mathbb{R}$

31 The set of zeroes of the function : $f : f(x) = 0$ is ....

ⓐ $\{0\}$ ⓑ $\mathbb{R} - \{0\}$ ⓒ ϕ ⓓ $\mathbb{R}$

32 The set of zeroes of the function : $f : f(x) = x(x^2 - 2x + 1)$ is ....

ⓐ $\{1\}$ ⓑ $\{0, 1\}$ ⓒ $\{0, -1\}$ ⓓ $\{0\}$

33 If : $z(f) = \{2\}$, $f(x) = x^3 - m$, then : $m =$ ....

ⓐ 1 ⓑ 2 ⓒ 4 ⓓ 8

34 If : $z(f) = \{5\}$, $f(x) = x^3 - 3x^2 + a$, then : $a =$ ....

ⓐ – 5 ⓑ 5 ⓒ – 50 ⓓ 50

35 If : $z(f) = \mathbb{R}$, $f(x) = (a - 3)x + b - 2$, then : $a + b =$ ....

ⓐ 1 ⓑ – 1 ⓒ 5 ⓓ – 5

36 The Domain of the function $f : f(x) = x^2 - 3x + 2$ is ....

ⓐ $\mathbb{R} - \{2, 1\}$ ⓑ $\{2, 1\}$ ⓒ $\mathbb{R}$ ⓓ $\mathbb{R} - \{0\}$

37 The Domain of the function $n : n(x) = \frac{x}{x^2 - 16}$ is ....

ⓐ $\mathbb{R} - \{4, -4\}$ ⓑ $\mathbb{R} - \{4\}$ ⓒ $\mathbb{R} - \{-4\}$ ⓓ $\mathbb{R}$

38 The Domain of the algebraic function $n : n(x) = \frac{x}{x^2 + 4}$ is ....

ⓐ $\mathbb{R} - \{2, -2\}$ ⓑ $\{2\}$ ⓒ $\mathbb{R}$ ⓓ $\mathbb{R} - \{-2\}$

39 If the Domain of the algebraic function n is $\mathbb{R} - \{2, 3, 4\}$, then : $n(3) =$ ....

ⓐ 2 ⓑ 3 ⓒ 4 ⓓ Undefined

40 If the Domain of the algebraic function $n : n(x) = \frac{x - 4}{x^2 + a}$ is $\mathbb{R}$, then : a 0

ⓐ $=$ ⓑ $<$ ⓒ $>$ ⓓ $\leqslant$

41 The set of zeroes of the function $f : f(x) = \frac{x^2 - 9}{x - 3}$ is ....

ⓐ $\{3, -3\}$ ⓑ $\{3\}$ ⓒ $\{0\}$ ⓓ $\{-3\}$

42 The common Domain of the two algebraic function : $\frac{2}{x^2 - 1}$ and $\frac{5x}{x^2 - x}$ is ....

ⓐ $\mathbb{R} - \{0, 1\}$ ⓑ $\mathbb{R} - \{1\}$ ⓒ $\mathbb{R} - \{0, 1, -1\}$ ⓓ $\mathbb{R} - \{1, -1\}$

43 If : $x = 3$ is one of zeroes of the function $f : f(x) = \frac{x^2 - 2x - k}{x^2 - 25}$, then : $k =$ ....

ⓐ 3 ⓑ 6 ⓒ -3 ⓓ -6

44 If the common Domain of the two algebraic function : $\frac{-7}{x + 2}$ and $\frac{x - 3}{x - a}$ is $\mathbb{R} - \{-2, 7\}$, then : $a =$ ....

ⓐ -2 ⓑ -7 ⓒ 3 ⓓ 7

45 The simplest form of the fraction $n : n(x) = \frac{4x^2 - 2x}{2x}$, $x \neq 0$ is ....

ⓐ $\frac{x - 2}{2}$ ⓑ $x - 2$ ⓒ $2x - 1$ ⓓ $\frac{2x - 1}{2}$

46 The simplest form of the fraction $n : n(x) = \frac{x}{x - 1} + \frac{1}{1 - x}$, $x \neq 1$ is ....

ⓐ $\frac{x + 1}{x - 1}$ ⓑ $\frac{x + 1}{1 - x}$ ⓒ 1 ⓓ -1

47 The additive inverse of the fraction $n : n(x) = \frac{x - 1}{x + 3}$, $x \neq -3$ is ....

ⓐ $\frac{x + 1}{x - 3}$ ⓑ $\frac{1 - x}{x + 3}$ ⓒ $\frac{x + 1}{-(x + 3)}$ ⓓ $\frac{1 - x}{-(x + 3)}$

48 The fraction $n : n(x) = \frac{x - 4}{x - 7}$ has an additive inverse to each $x \in$ ....

ⓐ $\mathbb{R} - \{4, 7\}$ ⓑ $\mathbb{R} - \{4\}$ ⓒ $\mathbb{R} - \{7\}$ ⓓ $\mathbb{R}$

49 If $n : n(x) = \frac{x-2}{x+5}$, then the domain of n^{-1} is ....

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R} - \{2\}$ ⓒ $\mathbb{R} - \{-5\}$ ⓓ $\mathbb{R} - \{2, -5\}$

50 If : $n(x) = \frac{x}{x^2+9}$, then the domain of n^{-1} is ....

ⓐ ϕ ⓑ $\mathbb{R} - \{-3, 3\}$ ⓒ $\mathbb{R} - \{0\}$ ⓓ $\mathbb{R}$

51 The multiplicative inverse of the fraction $n : n(x) = \frac{x-3}{x^2-9} \times \frac{x+3}{x}$ is ....

ⓐ $\frac{1}{x}$ ⓑ $\frac{-1}{x}$ ⓒ x ⓓ $-x$

52 The fraction $n : n(x) = \frac{x-4}{x-7}$ has an multiplicative inverse to each $x \in$ ....

ⓐ $\mathbb{R} - \{4, 7\}$ ⓑ $\mathbb{R} - \{4\}$ ⓒ $\mathbb{R} - \{7\}$ ⓓ $\mathbb{R}$

53 If : $n(x) = \frac{x-3}{x^2-4}$, then the domain of $n^{-1}(3) =$ ....

ⓐ 0 ⓑ 1 ⓒ 2 ⓓ Undefined

54 If : $n(x) = \frac{x-2}{x^2-5x+6}$ and $n^{-1}(x) = 5$, then : $x =$ ....

ⓐ 2 ⓑ 8 ⓒ 3 ⓓ 1

2 Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of each pair of the following equations

1	$2x - y = 3$	$x + 2y = 4$	$\{(2, 1)\}$
2	$3x + 4y = 24$	$x - 2y = -2$	$\{(4, 3)\}$
3	$3x + 2y = 11$	$2x + 3y = 14$	$\{(1, 4)\}$
4	$\frac{x}{6} + \frac{y}{3} = \frac{1}{3}$	$\frac{x}{2} + \frac{2y}{3} = 1$	$\{(2, 0)\}$
5	$x - y = 1$	$x^2 + y^2 = 25$	$\{(-3, -4), (4, 3)\}$
6	$x + y = 7$	$y^2 - x^2 = 7$	$\{(3, 4)\}$
7	$y - x = 3$	$x^2 + y^2 - xy = 13$	$\{(-4, -1), (1, 4)\}$
8	$x + y = 2$	$\frac{1}{x} + \frac{1}{y} = 2$	$\{(1, 1)\}$

3 Find in $\mathbb{R}$ the solution set of each of the following equations using the general formula

1. $2x^2 - 4x + 1 = 0$ (rounding the result to three decimal numbers) $\{0.293, 1.707\}$
2. $x(x-1) = 4$ (rounding the result to three decimal numbers) $\{-1.562, 2.562\}$
3. $x - \frac{4}{x} = 4$ (rounding the result to three decimal numbers) $\{-0.828, 4.828\}$
4. $\frac{8}{x^2} - \frac{1}{x} = 1$ (rounding the result to three decimal numbers) $\{-3.372, 2.372\}$
5. $(x-3)^2 - 5x = 0$ (rounding the result to three decimal numbers) $\{0.890, 10.110\}$

4 in each of the following Find n(x) in the simplest form showing the domain of each of them

1. $n(x) = \frac{x^2 - 25}{x^2 - 3x - 10}$

2. $n(x) = \frac{x^3 - 4x}{x^3 - 5x^2 + 6x}$

3. $n(x) = \frac{x}{x - 4} + \frac{x + 4}{x^2 - 16}$

4. $n(x) = \frac{x - 6}{2x^2 - 15x + 18} + \frac{x - 5}{15 - 13x + 2x^2}$

5. $n(x) = \frac{x^2 + 2x + 4}{x^3 - 8} - \frac{9 - x^2}{x^2 + x - 6}$

6. $n(x) = \frac{x^2 - 3x + 2}{1 - x^2} \div \frac{3x - 15}{x^2 - 6x + 5}$

7. $n(x) = \frac{x^2 - 5x}{x^2 - 8x + 15} - \frac{x^2 + 3x + 9}{x^3 - 27}$, then find $n(1)$ and $n(5)$

8. $n(x) = \frac{x^3 - 1}{x^2 - 2x + 1} \times \frac{2x - 2}{x^2 + x + 1}$

9. $n(x) = \frac{x^3 - 1}{x^2 - x} \times \frac{x + 3}{x^2 + x + 1}$

10. $n(x) = \frac{x^2 + 2x - 3}{x + 3} \div \frac{x^2 - 1}{x + 1}$

11. $n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$

12. $n(x) = \frac{x^2 - 49}{x^3 - 8} \div \frac{x + 7}{x - 2}$, then find $n(1)$

5 Answer the following question

1. If the Domain of the algebraic function $n : n(x) = \frac{x - 1}{x^2 + ax + 9}$ is $\mathbb{R} - \{3\}$, then.
   Find the value a.

2. If the Domain of the algebraic function $n : n(x) = \frac{x + 2}{x^2 + ax + b}$ is $\mathbb{R} - \{2, 3\}$.
   Find the value a and b.

3. If : $n_1(x) = \frac{x^2 - x}{x^3 - 2x^2}$ and $n_2(x) = \frac{x^2 - 3x + 2}{x^3 - 4x^2 + 4x}$. **Prove that :** $n_1 = n_2$.

4. If the set of zeros of the function $f : f(x) = ax^2 + bx + 15$ is $\{3, 5\}$
   Find the value a and b.

5. A length of a rectangle is 3 cm. more than its width and its area is 28 cm^2. **Find its perimeter.**

6. A right angled triangle in which the length of the hypotenuse = 13 cm.
   and its perimeter = 30 cm. **Find the area of the triangle.**

7. **Graph the function** $f : f(x) = x^2 - 6x + 5$ in the interval $[0, 6]$, and from the graph and its
   Find the solution set of the equation : $x^2 - 6x + 5 = 0$.

8. A two-digit number, the sum of its digits is 11, if the two digits reversed, then the resulted number is 27 more than the original number, **what is the original number.**

9. Two acute angles in a right-angled triangle, the difference between their measures = 50°
   Find the measure of each angle.

10. **Find the value a and b**, if $(3, -1)$ is the solution set of the two equations :
    $ax + by = 5$ and $3ax + by = 17$

Al Basic in mathematics . A new starting

1 Choose the correct answer from those given

1 $\{(-5,5)\}$	2 $\{(3,1)\}$	3 The origin point	4 $\{(3,4)\}$
5 zero	6 Parallel	7 Coincident	8 $a = 3$
9 $k \neq 4$	10 $k = 3$	11 Infinite numbers	12 $k = 3$
13 9 and 4	14 $x + 8$	15 $x - 4$	16 $x + 10y$
17 ϕ	18 zero	19 $\{2,3\}$	20 ϕ
21 Intersect X-axis in one point	22 4	23 1	24 zero
25 4 and 5	26 2	27 4	28 $\{(3,3),(-3,-3)\}$
29 $(4,2)$	30 $\{0\}$	31 $\mathbb{R}$	32 $\{0,1\}$
33 8	34 -50	35 5	36 $\mathbb{R}$
37 $\mathbb{R}-\{4,-4\}$	38 $\mathbb{R}$	39 Undefined	40 $>$
41 $\{-3\}$	42 $\mathbb{R}-\{0,1,-1\}$	43 3	44 7
45 $2x-1$	46 1	47 $\frac{1-x}{x+3}$	48 $\mathbb{R}-\{7\}$
49 $\mathbb{R}-\{2,-5\}$	50 $\mathbb{R}-\{0\}$	51 x	52 $\mathbb{R}-\{4,7\}$
53 Undefined	54 8		

2 Find algebraically in $\mathbb{R}\times\mathbb{R}$ the solution set of each pair of the following equations

1 $2x - y = 3$ ① $\quad x + 2y = 4$ ②

Multiply the two sides of equation ① by 2

We get : $4x - 2y = 6$ ③

adding ③ + ② $\quad 4x - \cancel{2y} = 6$ ③

$x + \cancel{2y} = 4$ ②

$\therefore 5x = 10 \quad \therefore x = 2$

By substituting in ② $\quad \therefore 2 + 2y = 4$

$\therefore 2y = 4 - 2 = 2 \quad \therefore y = 1$

$\therefore$ S.S $= \{(2,1)\}$

2 $3x + 4y = 24$ ① $\quad x - 2y = -2$ ②

Multiply the two sides of equation ② by 2

We get : $2x - 4y = -4$ ③

adding ③ + ① $\quad 2x - \cancel{4y} = -4$ ③

$3x + \cancel{4y} = 24$ ①

$\therefore 5x = 20 \quad \therefore x = 4$

By substituting in ① $\quad \therefore 3 \times 4 + 4y = 24$

$\therefore 4y + 12 = 24 \quad \therefore 4y = 24 - 12 = 12$

$\therefore y = 3 \quad \therefore$ S.S $= \{(4,3)\}$

3 $3x + 2y = 11$ ① $\quad 2x + 3y = 14$ ②

Multiply the two sides of equation ① by 3

We get : $9x + 6y = 33$ ③

Multiply the two sides of equation ② by -2

We get : $-4x - 6y = -28$ ④

adding ③ + ④ $\quad 9x + \cancel{6y} = 33$ ③

$-4x - \cancel{6y} = -28$ ④

$\therefore 5x = 5 \quad \therefore x = 1$

By substituting in ① $\quad \therefore 3 + 2y = 11$

$\therefore 2y = 11 - 3 = 8 \quad \therefore y = 4$

$\therefore$ S.S $= \{(1,4)\}$

4 $\frac{x}{6} + \frac{y}{3} = \frac{1}{3}$ ① $\quad \frac{x}{2} + \frac{2y}{3} = 1$ ②

Multiply the two sides of equation ① by 10

We get : $2x + 4y = 4$ ③

Multiply the two sides of equation ② by -6

We get : $-3x - 4y = -12$ ④

adding ③ + ④ $\quad 2x + \cancel{4y} = 4$ ③

$-3x - \cancel{4y} = -6$ ④

$\therefore -x = -2 \quad \therefore x = 2$

By substituting in ③ $\quad \therefore 4 + 4y = 4$

$\therefore 4y = 4 - 4 = 0 \quad \therefore y = 0$

$\therefore$ S.S $= \{(2,0)\}$

5 $x - y = 1$ ① $\quad x^2 + y^2 = 25$ ②

From eq ① $x - y = 1$ We get $x = 1 + y$ ③

By substituting in ② $\therefore (1+y)^2 + y^2 = 25$

$\therefore 1 + 2y + y^2 + y^2 = 25$

$\therefore 2y^2 + 2y + 1 - 25 = 0$

$\therefore 2y^2 + 2y - 24 = 0$ divide both sides by 2

$\therefore y^2 + y - 12 = 0 \quad \therefore (y-3)(y+4) = 0$

$\therefore y = 3$ or $y = -4$

By substituting in ③

At : $y = 3 \quad \therefore x = 1 + 3 = 4$

At : $y = -4 \quad \therefore x = 1 + (-4) = -3$

$\therefore$ S.S $= \{(-3, -4), (4, 3)\}$

6 $x + y = 7$ ① $\quad y^2 - x^2 = 7$ ②

From eq ① $x + y = 7$ We get $y = 7 - x$ ③

By substituting in ② $\therefore (7-x)^2 - x^2 = 7$

$\therefore 49 - 14x + x^2 - x^2 = 7$

$\therefore -14x + 49 - 7 = 0$

$\therefore -14x + 42 = 0 \quad \therefore -14x = -42$

$\therefore x = 3$

By substituting in ③

At : $x = 3 \quad \therefore y = 7 - 3 = 4$

$\therefore$ S.S $= \{(3, 4)\}$

7 $y - x = 3$ ① $\quad x^2 + y^2 - xy = 13$ ②

From eq ① $y - x = 3$ We get $y = 3 + x$ ③

By substituting in ②

$\therefore x^2 + (3+x)^2 - x(3+x) = 13$

$\therefore x^2 + 9 + 6x + x^2 - 3x - x^2 - 13 = 0$

$\therefore x^2 + 3x - 4 = 0 \quad \therefore (x-1)(x+4) = 0$

$\therefore x = 1$ or $x = -4$

By substituting in ③

At : $x = 1 \quad \therefore y = 3 + 1 = 4$

At : $x = -4 \quad \therefore y = 1 + (-4) = -1$

$\therefore$ S.S $= \{(-4, -1), (1, 4)\}$

8 $x + y = 2$ ① $\quad \frac{1}{x} + \frac{1}{y} = 2$ ②

Multiply the two sides of equation ② by xy

We get : $y + x = 2xy$ ③

From eq ① $y + x = 2$ We get $y = 2 - x$ ③

By substituting in ③

$\therefore 2 - x + x = 2x(2-x) \quad \therefore 2 = 4x - 2x^2$

$\therefore 2x^2 - 4x + 2 = 0$ divide both sides by 2

$\therefore x^2 - 2x + 1 = 0 \quad \therefore (x-1)^2 = 0$

$\therefore x = 1$

By substituting in ①

At : $x = 1 \quad \therefore y = 2 - 1 = 1$

3 Find in $\mathbb{R}$ the solution set of each of the following equations using the general formula

1 $2x^2 - 4x + 1 = 0$

$a = 2, b = -4$ and $c = 1$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{4 \pm \sqrt{16 - 4 \times 2 \times 1}}{2 \times 2}$$

$= \frac{4 \pm \sqrt{8}}{4} \quad \therefore x = \frac{4 + \sqrt{8}}{4} = 1.707$

or $x = \frac{4 - \sqrt{8}}{4} = 0.293$

$\therefore$ S.S $= \{1.707, 0.293\}$

2 $x(x-1) = 4 \quad \therefore x^2 - x - 4 = 0$

$a = 1, b = -1$ and $c = -4$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{1 \pm \sqrt{1 - 4 \times 1 \times -4}}{2 \times 1}$$

$= \frac{1 \pm \sqrt{17}}{2} \quad \therefore x = \frac{1 + \sqrt{17}}{2} = 2.562$

or $x = \frac{1 - \sqrt{17}}{2} = -1.562$

$\therefore$ S.S $= \{-1.562, 2.562\}$

3 $x - \frac{4}{x} = 4$ Multiply both sides by x

$\therefore x^2 - 4 = 4x \quad \therefore x^2 - 4x - 4 = 0$

$a = 1, b = -4$ and $c = -4$

Complete by yourself

4 $\frac{8}{x^2} - \frac{1}{x} = 1$ Multiply both sides by x^2

$\therefore 8 - x = x^2 \quad \therefore x^2 + x - 8 = 0$

$a = 1, b = 1$ and $c = -8$

Complete by yourself

5 $(x-3)^2 - 5x = 0 \quad \therefore x^2 - 6x + 9 - 5x = 0 \quad \therefore x^2 - 11x + 9 = 0$

$a = 1, b = -11$ and $c = 9$

Complete by yourself

4 in each of the following Find $\mathrm{n}(x)$ in the simplest form showing the domain of each of them

1 $\mathrm{n}(x) = \dfrac{x^2 - 25}{x^2 - 3x - 10} = \dfrac{(x-5)(x+5)}{(x-5)(x+2)}$

$\therefore$ Domain $= \mathbb{R} - \{5, -2\}$

$, \mathrm{n}(x) = \dfrac{\cancel{(x-5)}(x+5)}{\cancel{(x-5)}(x+2)} = \dfrac{(x+5)}{(x+2)}$

2 $\mathrm{n}(x) = \dfrac{x^3 - 4x}{x^3 - 5x^2 + 6x} = \dfrac{x(x-2)(x+2)}{x(x-3)(x-2)}$

$\therefore$ Domain $= \mathbb{R} - \{0, 3, 2\}$

$, \mathrm{n}(x) = = \dfrac{\cancel{x}\cancel{(x-2)}(x+2)}{\cancel{x}(x-3)\cancel{(x-2)}} = \dfrac{(x+2)}{(x-3)}$

3 $\mathrm{n}(x) = \dfrac{x}{x-4} + \dfrac{x+4}{x^2-16}$

$= \dfrac{x}{x-4} + \dfrac{x+4}{(x-4)(x+4)}$

$\therefore$ Domain $= \mathbb{R} - \{4, -4\}$

$, \mathrm{n}(x) = \dfrac{x}{x-4} + \dfrac{\cancel{x+4}}{(x-4)\cancel{(x+4)}}$

$= \dfrac{x}{x-4} + \dfrac{1}{x-4} = \dfrac{(x-1)}{(x-4)}$

4 $\mathrm{n}(x) = \dfrac{x-6}{2x^2 - 15x + 18} + \dfrac{x-5}{15 - 13x + 2x^2}$

$= \dfrac{x-6}{(2x-3)(x-6)} + \dfrac{x-5}{(2x-3)(x-5)}$

$\therefore$ Domain $= \mathbb{R} - \{6, 5, \frac{3}{2}\}$

$, \mathrm{n}(x) = \dfrac{\cancel{x-6}}{(2x-3)\cancel{(x-6)}} + \dfrac{\cancel{x-5}}{(2x-3)\cancel{(x-5)}}$

$= \dfrac{1}{2x-3} + \dfrac{1}{2x-3} = \dfrac{2}{2x-3}$

5 $\mathrm{n}(x) = \dfrac{x^2 + 2x + 4}{x^3 - 8} - \dfrac{9 - x^2}{x^2 + x - 6}$

$= \dfrac{x^2 + 2x + 4}{(x-2)(x^2 + 2x + 4)} + \dfrac{x^2 - 9}{(2x-3)(x-5)}$

$= \dfrac{\cancel{x^2 + 2x + 4}}{(x-2)\cancel{(x^2 + 2x + 4)}} + \dfrac{(x-3)\cancel{(x+3)}}{\cancel{(x+3)}(x-2)}$

$\therefore$ Domain $= \mathbb{R} - \{2, -3\}$

$, \mathrm{n}(x) = \dfrac{1}{x-2} + \dfrac{x-3}{x-2} = \dfrac{x-2}{x-2} = 1$

6 $\mathrm{n}(x) = \dfrac{x^2 - 3x + 2}{1 - x^2} \div \dfrac{3x - 15}{x^2 - 6x + 5}$

$= \dfrac{(x-1)(x-2)}{-(x^2-1)} \div \dfrac{3(x-5)}{(x-5)(x-1)}$

$= \dfrac{\cancel{(x-1)}(x-2)}{-\cancel{(x-1)}(x+1)} \times \dfrac{\cancel{(x-5)}(x-1)}{3\cancel{(x-5)}}$

$\therefore$ Domain $= \mathbb{R} - \{1, -1, 5\}$

$, \mathrm{n}(x) = \dfrac{x-2}{x+1} + \dfrac{x-1}{3} = \dfrac{(x-1)(x-2)}{3(x+1)}$

7 $\mathrm{n}(x) = \dfrac{x^2 - 5x}{x^2 - 8x + 15} - \dfrac{x^2 + 3x + 9}{x^3 - 27}$

$= \dfrac{x\cancel{(x-5)}}{(x-3)\cancel{(x-5)}} - \dfrac{\cancel{x^2 + 3x + 9}}{(x-3)\cancel{(x^2 + 3x + 9)}}$

$\therefore$ Domain $= \mathbb{R} - \{3, 5\}$

$, \mathrm{n}(x) = \dfrac{x}{x-3} + \dfrac{1}{x-3} = \dfrac{x+1}{x-3}$

$\because 1 \in$ Domain $\quad \therefore \mathrm{n}(1) = \dfrac{1+1}{1-3} = -2$

$\because 5 \notin$ Domain $\quad \therefore \mathrm{n}(5)$ undefined

Complete by yourself

5 Answer the following question

1 $\because$ domain $= \mathbb{R} - \{3\}$ $\quad \therefore x^2 + a x + 9 = 0$ at $x = 3$ substituting by 3 in the denominator

$\therefore 9 + 3a + 9 = 0$ $\quad \therefore 3a = -18$ $\quad \therefore a = -6$

2 $\because$ domain $= \mathbb{R} - \{2, 3\}$

$\therefore x^2 + a x + b = 0$ at $x = 2$ and 3

substituting by 2 in the denominator $\quad \therefore 4 + 2a + b = 0$ $\quad \therefore 2a + b = -4$ ①

substituting by 3 in the denominator $\quad \therefore 9 + 3a + b = 0$ $\quad \therefore 3a + b = -9$ ②

Multiply the two sides of equation ① by -1 $\quad$ We get : $-2a - b = 4$ ③

adding ③ + ② We get : $a = -5$ $\quad$ By substituting in ① $\therefore b = 6$

3 $\because \mathrm{n}_1(x) = \dfrac{x^2 - x}{x^3 - 2x^2} = \dfrac{x(x-1)}{x^2(x-2)} = \dfrac{(x-1)}{x(x-2)}$ and its domain $= \mathbb{R} - \{0, 2\}$ ①

$, n_1(x) = \frac{x^2 - 3x + 2}{x^3 - 4x^2 + 4x} = \frac{(x-1)(x-2)}{x(x-2)(x-2)} = \frac{(x-1)}{x(x-2)}$ and its domain $= \mathbb{R} - \{0, 2\}$ ②

From ① and ② $\therefore n_1 = n_2$

4 $\because z(f) = \{3, 5\}$

$\therefore f(3) = 0$ $\quad \therefore 9a + 3b + 15 = 0$ $\quad \therefore 9a + 3b = -15$ ①

$, f(5) = 0$ $\quad \therefore 25a + 5b + 15 = 0$ $\quad \therefore 25a + 5b = -15$ ②

Multiply the two sides of equation ① by -5 We get : $-45a - 15b = 75$ ③

Multiply the two sides of equation ② by 3 We get : $75a + 15b = -45$ ④

adding ③ + ④ We get : $30a = 30$ $\quad \therefore a = 1$

By substituting in ① $\therefore b = -8$

5 $\because$ let length $= x$ and width $= y$

A length of a rectangle is 3 cm. more than its width means : $x - y = 3$ ①

area is 28 cm.^{2} means : $xy = 28$ ②

solve the two equations together by yourself $x = 7$ and $y = 3$

6 $\because$ let the lengths of the two sides of the right-angle are x and y

the length of the hypotenuse = 13 cm. $\Longrightarrow x^2 + y^2 = 169$ ①

perimeter = 30 cm. $\Longrightarrow x + y + 13 = 30$ $\Longrightarrow x + y = 17$ ②

solve the two equations together by yourself $x = 12$ and $y = 5$

7 *try yourself*

8 $\because$ let the digit of ones is x and the digit of tens is y then : the number is $x + 10y$

the sum of its digits is 11 $\Longrightarrow x + y = 11$ ①

if the two digits reversed $(y + 10x)$, then the resulted number is 27 more than the original number

$(y + 10x) - (x + 10y) = 27 \Longrightarrow 9x - 9y = 27$ divide both sides by 9 $\Longrightarrow x - y = 3$ ②

solve the two equations together by yourself $x = 7$ and $y = 4$

9 $\because$ let the measures of the two angles are x and y

Two acute angles in a right-angled triangle $\Longrightarrow x + y = 90$ ①

the difference between their measures $= 50^\circ$ $\Longrightarrow x - y = 50$ ②

solve the two equations together by yourself $x = 70$ and $y = 20$

10 $\because (3, -1)$ is the solution set of the equation : $ax + by = 5$ $\quad \therefore 3a - b = 5$ ①

$\because (3, -1)$ is the solution set of the equation : $3ax + by = 17$ $\quad \therefore 9a - b = 17$ ②

Multiply the two sides of equation ① by -1 We get : $-3a + b = -5$ ③

adding ③ + ② We get : $6a = 12$ $\quad \therefore a = 2$

By substituting in ① $\therefore b = 1$

Al Basit in mathematics . A new starting

3rd prep Final revision SECOND TERM

Al gebra

(1)Choose the correct answer:

(1) If A and B are two events in a sample space for a random experiment where A ⊂ B , then P (A ⋂ B) = …………..

(a) P (B) (b) P (A) (c) zero (d) ∅

(2) If $x^2 - y^2 = 15$ and $x - y = 3$, then $x + y$ = …….

(a) -5 (b) -3 (c) 3 (d) 5

(3) $(-1)^{99} + (-1)^{100} =$ …………..

(a) -2 (b) zero (c) 1 (d) 2

(4) The set of zeroes of the function $f(x) = \frac{2-x}{7}$ is ……..

(a) {7} (b) {2 , 7} (c) {2} (d) ∅

(5) If x is a negative number , then the greatest number from the following numbers is …………..

(a) $5 - x$ (b) $5 + x$ (c) $\frac{5}{x}$ (d) $5x$

(6) The function f where $f(x) = \frac{x-2}{x-5}$ has a multiplicative inverse if its domain is ……….

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R} - \{2\}$ (d) $\mathbb{R} - \{2, 5\}$

(7) The point of the intersection of the two straight lines:

$x = 4$, $y - 3 = 0$ is ………………..

(a) (4 , 3) (b) $(-4, 3)$ (c) $(-3, 4)$ (d) (3 , 4)

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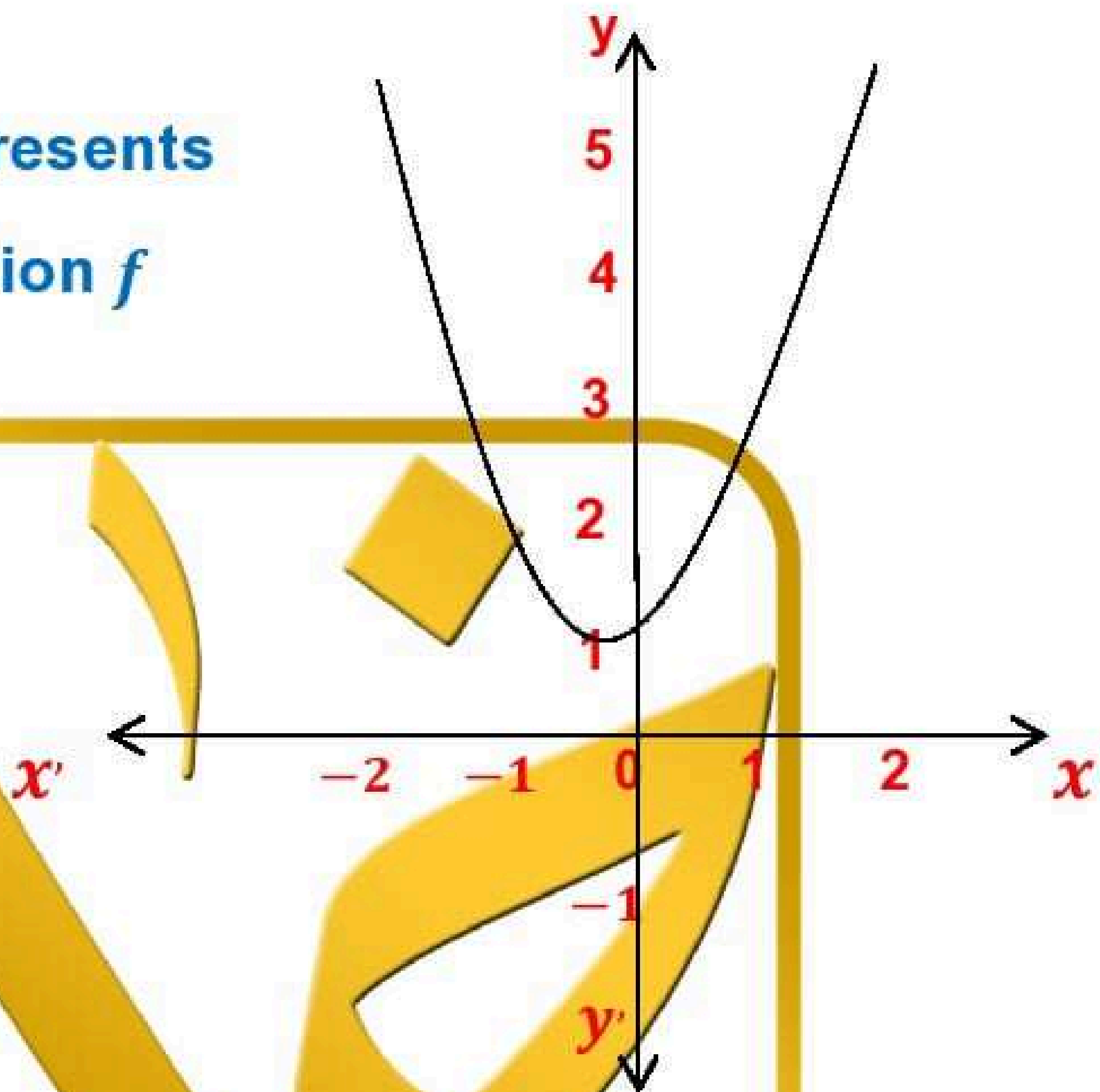
(8) In the opposite figure represents
The curve of a quadratic function f
Then the solution set
of the equation $f(x) = 0$
is ……………..



(a) $\varnothing$ (b) {1} (c) {0} (d) { (0 , 1) }

(9) If a regular die is tossed once, the probability of a appearance of a number less than 3 equals ……….

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$

(10) The set of zeroes of $f(x) = x^2 + 9$ is ……………

(a) $\{3 , -3\}$ (b) $\varnothing$ (c) {3} (d) $\{-3\}$

(11) If the two equations : $x + 4y = 7$ and $3x + ky = 21$ have infinite number of solutions in $\mathbb{R} \times \mathbb{R}$, then k = ………..

(a) 4 (b) 7 (c) 12 (d) 21

(12) If $y^{-3} = 8$, then y = …………

(a) $\frac{1}{512}$ (b) $\frac{1}{8}$ (c) 2 (d) $\frac{1}{2}$

(13) [2 , 5] is the solution set of the inequality …………..

(a) $1 \leq x - 1 \leq 4$ (b) $1 < x - 1 < 4$

(c) $1 \leq x - 1 < 4$ (d) $1 < x - 1 \leq 4$

(14) If a die is rolled once , then the probability of getting an odd number and even number together = ……………..

(a) $\frac{1}{2}$ (b) zero (c) $\frac{3}{4}$ (d) 1

(15) $\sqrt[3]{27} - \sqrt[3]{-27}$ = ……………

(a) 6 (b) zero (c) -3 (d) -6

(16) The number of solutions for the two equations: $x - \frac{1}{2}y = 4$, $2x - y = 2$ in $\mathbb{R}^2$ = ………….

(a) 1 (b) 2 (c) infinite number (d) zero

(17) The domain of the algebraic fraction $\frac{x-5}{3}$ equals the domain of the algebraic fraction ………….

(a) $\frac{x}{x^2+1}$ (b) $\frac{x}{x-3}$ (c) $\frac{x}{x-5}$ (d) $\frac{x-5}{x-3}$

(18) The ordered pair which satisfies the two equations:

$x\,y = 2$ and $x - y = 1$ is ………….

(a) (1 , 1) (b) (2 , 1) (c) (1 , 2) (d) ($\frac{1}{2}$, 1)

(19) If n $(x) = \frac{x-2}{2}$, then the domain of n^{-1} is …………..

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{0\}$ (d) $\mathbb{R} - \{0, 2\}$

(20) The probability of the impossible event equals ……….

(a) zero (b) $\emptyset$ (c) 1 (d) S

(21) The solution set of the two equations: : $x + 2y = 0$ and $2x - 3y = 0$ in $\mathbb{R} \times \mathbb{R}$ is ……….

(a) $\{(-2, 0)\}$ (b) { (3 , 2) } (c) { (0 , 0) } (d) { (2 , 3) }

(22) If $2^7 \times 3^7 = 6^k$, then k = ……….

(a) 14 (b) 7 (c) 6 (d) 5

(23) The degree of the polynomial function $where$:

$f(x) = x^3 + 2x - 3$ is ……………………

(a) fourth (b) third (c) first (d) zero

(24) If $x + y = 4$ and $x - y = -2$, then $x^2 - y^2$ = ……………

(a) 8 (b) 12 (c) -8 (d) -12

(25) The set of zeroes of the function $f : f(x) = \frac{x^2 + x - 2}{x^2 - 4}$ is ……

(a) $\{-2, 1\}$ (b) $\mathbb{R} - \{2, -2\}$ (c) $\{-1\}$ (d) {1}

(26) If P (A) = 4 P (A'), then P (A) = ……………

(a) 0.8 (b) 0.6 (c) 0.4 (d) 0.2

(27) If $x = y + 1$, $(y - x)^2 + y = 3$, then x = ……………

(a) 5 (b) 4 (c) 3 (d) 2

(28) The set of zeroes of $where : f(x) = -3x$ is ………………

(a) {0} (b) $\{-3\}$ (c) $\{-3, 0\}$ (d) $\mathbb{R}$

(29) If A , B are two events from the sample of a random experiment , P (A) = 0.7 and P(A $- B$) = 0.5 , then P(A $\cap$ B) = ……..

(a) 0.6 (b) 0.4 (c) 0.3 (d) 0.2

(30) If the two straight lines which represent the two equations:

$x + 2y = 4$, $2x + ky = 11$ are parallel , then k = …………

(a) 7 (b) 6 (c) 4 (d) -4

(31) The common domain of the two fractions: $\frac{2}{x - 3}$, $\frac{7}{2x - 6}$ is …

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{0 , 3\}$ (c) $\mathbb{R} - \{3\}$ (d) $\mathbb{R} - \{3 , -3\}$

(32) The two straight lines: $x = 4$, $y = 3$ are intersecting in …….

(a) (4 , 3) (b) (0 , 0) (c) (3 , 4) (d) $(-3 , -4)$

(33) If X , Y are two mutually exclusive events of sample space of a random experiment , then P (X $\cap$ Y) = ………

(a) $\emptyset$ (b) zero (c) { } (d) 1

(34) The two equations of first degree in two variables which have an infinite number of solutions are represented by two straight lines those are …………

(a) parallel (b) intersecting (c) distance (d) coincident

(35) If $f(x) = \frac{7 + x}{7 - x}$, $x \in \mathbb{R} - \{7 , -7\}$, *then* $f(-2) =$ ………..

(a) $\frac{-1}{f(-2)}$ (b) $\frac{-1}{f(2)}$ (c) $\frac{1}{f(2)}$ (d) $\frac{1}{f(-2)}$

(36) If the sum of two numbers is 8 , and their product is 15 , then the two numbers are ………..

(a) 2 , 6 (b) 3 , 5 (c) 4 , 4 (d) 1 , 15

(37) If a die is tossed once, then the probability of appearance of an odd number is ……………

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) 3

(38) The simplest of $f(x) = \frac{3-x}{x-3}$, $x \neq 3$ is ………

(a) 3 (b) 1 (c) -1 (d) zero

(39) In equation: $a x^2 + b x + c = 0$ if $b^2 - 4ac > 0$, then this equation has …………… roots

(a) 1 (b) 2 (c) zero (d) infinite

(40) If $3x = 1$, $then\ \frac{1}{5}\ x =$ …………

(a) $\frac{3}{5}$ (b) $\frac{1}{15}$ (c) $\frac{1}{3}$ (d) $\frac{1}{8}$

(41) $\sqrt{64+36}$ = 8 + ……………

(a) 2 (b) 6 (c) 10 (d) 14

(42) If A' is a complement event of A , then A ∪ A' = ……………

(a) $\emptyset$ (b) A' (c) sample space (d) A

(43) $3^7 + 3^7 + 3^7$ = ……….

(a) 9^7 (b) 3^{21} (c) 27^7 (d) 3^8

(44) If A and B are two events from the sample of the random experiment and P(A) = 0.7 , P (A $- B$) = 0.5, then P (A ∩ B) =…….

(a) 0.4 (b) 0.3 (c) 0.2 (d) 0.1

(45) The two straight lines: $3x = 7$, $2y = 9$ are ……………

(a) perpendicular (b) coincident

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(c) intersect and non-perpendicular (d) parallel

(46) If (5 , A -4) = (B + 2 , 3) , then A + B = ………….

(a) 2 (b) 3 (c) 10 (d) 5

(47) The multiplicative identity in $\mathbb{Z}$ is ……………

(a) zero (b) 1 (c) -1 (d) 2

(48) The arithmetic mean of the values 2 , 3 , 4 , 7 and 9 is ……

(a) 4 (b) 5 (c) 6 (d) 8

(49) If z (f) = {3} , $f(x) = 2x + a$, then a = ……….

(a) zero (b) 6 (c) -6 (d) 3

(50) If $x - 3 = 0$, $y^2 = x + 6$, then y = ……….

(a) -3 (b) 3 (c) ± 3 (d) 9

(51) $(99)^2 - 1$ = ………….

(a) 9800 (b) 10000 (c) $(98)^2$ (d) 9900

(52) If the function f is a function from set X to set Y , then the domain of the function is ……………

(a) X (b) Y (c) X $\times$ Y (d) Y $\times$ X

(53) The multiplicative inverse of the number $\frac{\sqrt{2}}{3}$ is ……….

(a) $\frac{-\sqrt{2}}{3}$ (b) $\frac{3\sqrt{2}}{2}$ (c) $\frac{2\sqrt{3}}{3}$ (d) $\frac{\sqrt{2}}{3}$

(54) $\sqrt{8} - \sqrt{2}$ = ……….

(a) $\sqrt{6}$ (b) $\sqrt{10}$ (c) $\sqrt{2}$ (d) 4

(54) If $(x - 5)^{zero} = 1$, for every $x \in$ ………….

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R} - \{-5\}$ (d) $\mathbb{R} - \{-1\}$

(55) If the curve of the function $f(x) = x^2 - a$ passing through the point (2 , 0) , then a = ……….

(a) 4 (b) 7 (c) 9 (d) 16

(56) If the point (5 , b $- 7$) lies on the x-axis , then b = ……….

(a) 2 (b) 3 (c) 5 (d) 7

Answer the following questions:

(1) Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations simultaneously:

$$x - 2y = 0 \text{ and } x^2 - y^2 = 3$$

(2) Using the general formula to find the solution set of the equation: $x^2 - 2x - 4 = 0$ approximating the result to the nearest one decimal place

(3) Find n (x) in the simplest form showing the domain of n where:

$$n(x) = \frac{x^2 + 2x + 1}{2x - 8} \times \frac{x - 4}{x + 1}$$

(4) If A and B are two events in a sample space for a random experiment , P (A) = 0.6 , P (B) = 0.5 and P (A ⋂ B) = 0.3, then Find:

(1) P (A ⋃ B) (2) P (A – B) (3) P (B')

(5) If n (x) = $\frac{x - 5}{x + 3}$ Find:

(1) $n^{-1}(x)$ showing the domain

(2) $n^{-1}(4)$

(6) If $n_1(x) = \frac{2x}{2x+4}$, $n_2(x) = \frac{x^2+2x}{x^2+4x+4}$, prove that : $n_1 = n_2$

(7) Find n (x) in the simplest form showing the domain of n where:

$$n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$$

(8) Find in $\mathbb{R}\times\mathbb{R}$ the solution set of the following two equations graphically:

$$2x + y = 1 \quad , \quad x + 2y = 5$$

(9) A box contains 30 identical cards numbered from 1 to 30 and a card was drawn randomly.
Calculate the probability that the number on the drawn card is :
(1) Divided by 4 (2) A prime number

(10) By using a general rule , Find in $\mathbb{R}$ the solution of the equation: $x^2 + 7x + 2 = zero$, approximating the result to the nearest tenth

(11) If A , B are two events in a random experiment where:
P (A) = 0.7 , P (B) = 0.6 , P (A ∩ B) = 0.3
Calculate the value of:
(1) P (A')
(2) P (A – B)
(3) P (A ∪ B)

(12) Solve in $\mathbb{R}$ the equation: $x^2 - 3x + 1 = zero$ by using the general rule , knowing that: $\sqrt{5} \simeq 2.24$

(13) If the domain of the function f , where $f(x) = \frac{x}{x^2 - 5x + m}$ is $\mathbb{R} - \{2, c\}$, then the value of : m and c

(14)

Find the values of a , b knowing that $(1, -1)$ is the solution of the two equations: $ax + by = 7$ and $ax - by = 3$

(15) Find the number which is formed from two digits , if the units digit is twice the tens digit, and if the product of the two digits equals $\frac{1}{3}$ the original number

(16) Find n (x) in the simplest form showing the domain of n where:

n (x) = $\frac{x^2 - x}{x^2 - 1} - \frac{-x - 5}{x^2 + 6x + 5}$

(17) If the domain of the function n:n (x) = $\frac{b}{x - 2} + \frac{6}{2x + a}$ Is $\mathbb{R} - \{2\}$, n (5) = 8 . Find the value of each a and b

(17) If $n_1(x) = \frac{x^2 - 4}{x^2 + x - 6}$, $n_2(x) = \frac{x^3 - x^2 - 6x}{x^3 - 9x}$, prove that :

$n_1(x) = n_2(x)$ for the values of x which belong to the common domain and find the domain

(18) IF A and B are two events from the sample space of a random experiment where: P (B) = $\frac{1}{12}$, P (A ∪ B) = $\frac{1}{3}$

Find P (A) in each of the following cases:

(1) A and B mutually exclusive

(2) $B \subset A$

(19) Find in $\mathbb{R} \times \mathbb{R}$ algebraically the solution set of two equations:

$$x - y = 0 \text{ and } 2x^2 - y^2 = 4$$

(20) A two digit number the sum of each digits is 11 if the two digits are reversed, then the result number is 27 more than the origin number. What is the original number

(21) If $f(x) = \frac{3x + 1}{x - 2} \div \frac{3x^2 + 16x + 5}{x^2 + 5x}$, then Find $f(x)$ in the simplest form and identify the domain of f, then Find $f(0)$,$f(-1)$

(22) Find in $\mathbb{R}$ the solution set of the equation: $x^2 - 2x - 4 = 0$ approximate to the nearest two decimals

(23) Draw the function curve f where $f(x) = x^2 - 2x + 1$ in the interval $[-1, 3]$ from the drawing Find:
The solution set of the equation $x^2 - 2x + 1 = 0$

(24) A bag contains 21 symmetric balls, 8 white , 6 red and the rest is black, one ball was drawn randomly , Find the probability that it was:

(1) White (2) Not black (3) Red or black

(25) Find the common domain of n_1, n_2 to be equal such that:

$$n_1(x) = \frac{x^2 + 3x + 2}{x^2 - 4} \quad , \; n_2(x) = \frac{x^2 - 1}{x^2 - 3x + 2}$$